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Effective Pre-School, Primary and Secondary Education Project (EPPSE 3-14)

Influences on Students' Development in Key Stage 3: Social-behavioural Outcomes in Year 9

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Executive Summary

This report provides a detailed analysis of the social-behavioural outcomes and development of students at the end of Key Stage 3 (KS3) in secondary schools in England. The research is part of the longitudinal Effective Pre-school Primary and Secondary Education (EPPSE) project. Measures of students' social-behavioural outcomes were based on individual teacher assessments conducted in Year 9. The investigation builds on earlier research that followed this group of students from early childhood at age 3 years through primary and into secondary school up to age 14. The EPPSE research has examined not only students' social-behavioural development but also their academic attainments (measured by national Teacher Assessments conducted at the end of KS3) in English, maths and science and dispositions (measured by factors from student completed questionnaires) such as academic self concept, enjoyment of school etc. The results in this report on social-behaviour outcomes complement those reported on academic and affective outcomes for this age group at the end of Key Stage 3 of secondary education (see Sammons et al., 2011a; 2011b).

The research focuses on four measures of social behaviour derived from exploratory and confirmatory factor analysis. These include two positive forms of behaviour - *Self regulation* and *Pro-sociability*, and two negative behaviours- *Hyperactivity* and *Anti-social behaviour*. In line with other research on social behaviour EPPSE found that most students are rated favourably by teachers in terms of their behaviour in secondary school. Teachers' ratings are skewed towards the positive end of the rating scales for most students and only a minority are identified as showing poor behaviour. For example, only approximately 17% of the sample were rated unfavourably in terms of high scores for 'hyperactivity', and even fewer (no more than 14%) for 'anti social' behaviour in Year 9.

The patterns of social behaviour studied now that students are in adolescence can be compared with earlier findings for this sample at younger ages (in pre-school and primary school). Although most students are still rated favourably in terms of social-behavioural outcomes at age 14, the proportions identified as showing negative behaviour has increased compared with previous patterns found in primary school.

At younger ages the EPPSE research showed that a range of factors related to child and family characteristics and the home learning environment (HLE) were important predictors of children's academic attainment and progress and their social-behavioural development up to the end of primary school (Sammons et al., 2008a; 2008b). The influence of such factors was detected at a young age and they continued to predict later educational outcomes.

While the relationships between individual child, family and home learning environment characteristics and student outcomes tends to be weaker for social-behavioural measures than for academic attainment, earlier phases of the research has shown that early experiences of socio-economic disadvantage predict poorer behavioural outcomes in both pre-school and primary school.

The earlier EPPSE results have contributed to current understanding about the relationships between social behaviour and children's academic development and the factors that increase the risk of poor outcomes or that promote resilience. The findings have also informed policy development in England (or example, see the EPPE research contribution to the Cabinet Office Equalities Review, 2006, and the family and child case studies, Siraj-Blatchford et al., 2011).

The 3-14 phase of the EPPSE research follows the EPPSE student sample in adolescence (Year 9 age 14) and provides new evidence about the continuing influence of individual, family and home learning influences. Teacher judgments of student behaviour in school have been found to be predictive of later development and provide an important perspective that can be compared with students' self reports of their own behaviour and dispositions and their experiences of secondary school.

This report identifies which individual student, family and home learning factors continue to predict EPPSE students' social behaviour at the end of KS3. The results show many similarities to findings about which factors were important at younger ages. While many finding on the impact of different background factors such as gender, family SES or income are similar to other research studies, EPPSE has additional data on the early years Home Learning Environment, (HLE) and parental qualifications that allows a deeper exploration of family influences on students across different phases of education. The findings demonstrate that family factors continue to influence students' social-behavioural development as well as their academic progress across KS3. It should be noted that in the analyses of developmental progress in KS3, prior social behaviour measured at the end of primary education (Y6 KS2) was controlled for in the statistical models.

This report focuses on quantitative analyses of factors that predict social-behavioural outcomes and developmental progress across KS3. A range of multilevel statistical models were developed to test which factors predict social-behavioural outcomes. Elsewhere, EPPSE has reported (in keeping with the mixed qualitative/quantitative methodology) findings from qualitative case studies of individual children and families that are more educationally successful in overcoming disadvantage and promote resilience (see Siraj-Blatchford et al., 2011). Such qualitative data helps to provide a broader understanding of the way disadvantage and other experiences shape children's educational outcomes and experiences as they move through different phases of education and into adolescence, and what factors may help to protect against the adverse consequences of disadvantage. These case studies show that certain behavioural traits can be important in supporting better attainment outcomes for vulnerable groups of disadvantaged students, and indicate that 'self regulation' and a positive early years HLE can help to protect students from social disadvantage and support better educational outcomes in the longer term.

As well as investigating the impact of child, family and HLE background, the EPPSE research has explored the continued influence of pre-school and primary school as predictors of students' later social-behavioural outcomes up to age 14 as well as measures related to students' secondary school experiences. The results provide new evidence on the way different educational settings (pre-school, primary and secondary) affect these students' social behaviour and developmental progress in KS3.

The aims of the research were to:

- investigate the variation in students' social-behavioural outcomes at the end of Key Stage 3;
- identify which background characteristics, individual student, family and home learning environment (HLE) predict social-behavioural outcomes at age 14;
- explore the influence of pre, primary and secondary school on social-behavioural outcomes and developmental progress;
- examine the combined impact of pre-school with the HLE as predictors of social-behavioural outcomes and establish how far any continuing pre-school effects are conditional upon other educational experiences such as those offered by the HLE;
- assess whether the continued impact of pre-school and primary school influences differs for more and less disadvantaged students;
- explore the effects of teaching and school processes on students' social-behavioural outcomes using student reported measures of such processes.

In order to maximise the sample size and to limit possible bias linked to missing data, multiple imputation of missing data was conducted. Careful comparisons of the results from both imputed and non imputed data sets were made and these indicate that the results are robust producing patterns that were broadly consistent. The similarities and differences between the original and the imputed data are highlighted throughout the report. The analyses reported are based on data for a longitudinal sample of a maximum N= 1,508 EPPSE students attending 444 secondary schools (original data set) and N= 2,933 students attending 775 secondary schools (imputed)[1].

[11] There is considerable variability in the sample size for the original data, depending on the fraction of missing data for the various predictors included in each estimated model. For the imputed data the sample size is relatively constant, except for models with structurally missing data (which we do not impute for substantive reasons). In each table we therefore indicate the number of students and the number of schools on which the estimates are based.

Summary of Main Findings

Variations in social-behavioural outcomes in Year 9 for different student groups

EPPSE investigated the influence of a wide range of demographic and socio-economic measures from parental interviews and questionnaires as predictors of student behaviour at age 14. These include individual characteristics, such gender, age, ethnicity, early childhood behavioural history, and family factors, including family size (number of siblings), parents' marital status, earned income, family highest socio-economic status (SES), as well as the highest level of parents' qualifications. EPPSE also investigated factors specific to the educational system in England, such as receipt of English as an Additional Language (EAL) support, Special Education Needs (SEN) status, and Free School Meals (FSM) eligibility. The following summarises the key findings.

Girls show better social-behavioural profiles than boys at age 14 in all four outcomes (e.g., ES=0.45 for 'self-regulation' and ES=-0.42 for 'anti-social'). Family SES, income and parents' highest qualification levels are also strong predictors. For example, the Effect Size (ES) for mothers having a degree or equivalent was ES=0.47 for 'self-regulation' and ES-0.40 for 'hyperactivity'. By contrast, there are weaker effects linked to parents' marital status, although there is a tendency for increased 'hyperactivity' and 'anti-social' behaviour for those from single parent families (ES=0.20 for 'hyperactivity' for single parents versus married parents).

The early years and KS2 home learning environment (HLE) continues to predict students' social-behavioural outcomes up to age 14, taking into account other influences. Those students who had experienced a more positive HLE in the early years and later on in primary school were rated more favourably by teachers in terms of various social-behavioural outcomes in Year 9 (ES=0.48 for the high versus low HLE groups).

Students with a record of Special Educational Needs (SEN) in secondary school show significantly poorer behavioural outcomes, the two possibly being reciprocal relationships. The strength of relationships is in line with the SEN research literature and findings for this group at younger ages (Anders et al., 2010; Taggart et al., 2006; Sammons et al., 2003; Sammons et al., 2004).

EPPSE developed an index of multiple disadvantage that provides a summary measure of overall disadvantage experienced by children in the EPPSE sample during the early years. This continues to be a strong predictor of differences in these students' later social behaviour up to age 14. Those who had experienced several disadvantages in the early years show poorer 'self-regulation' and 'pro-social' behaviour and increased scores for 'hyperactivity' and 'anti-social' behaviour in KS3.

Overall these findings on the individual and family factors that predict social-behavioural outcomes show similar patterns to those reported elsewhere for EPPSE students' academic attainments measured by national TAs in the three core curriculum subjects (English, maths and science) at the end of KS3.

TABLE 1: Summary of background influences on social-behavioural outcomes

Factors	Self-regulation	Pro-social	Hyperactivity	Anti-social
Student factors				
Gender (boys)	0.45	0.61	-0.54	-0.42
Age (continuous)	0.12	0.08	-0.08	ns
Birth weight (normal)				
Foetal infant/very low weight	ns	ns	ns	ns
Low birth weight	ns	ns	ns	ns
Number of siblings (none)				
1 sibling	0.13	0.11	-0.15	-0.12
2 siblings	ns	ns	ns	ns
3 siblings	ns	ns	ns	ns
Ethnicity (White UK heritage)				
White European heritage	ns	ns	ns	ns
Black Caribbean heritage	ns	ns	ns	ns
Black African heritage	ns	ns	ns	ns
Any other ethnic minority	ns	ns	ns	ns
Indian heritage	0.33	ns	-0.33	ns
Pakistani heritage	ns	ns	ns	ns
Bangladeshi heritage	0.37	ns	-0.48	-0.34
Mixed race	ns	ns	ns	ns
Early behavioural problems (none)				
1 Behavioural Problem	-0.30	-0.28	0.36	0.32
2+ Behavioural Problems	-0.34	ns	0.44	0.33
Family factors				
Parents' Highest SES at KS2 (unemployed/not working)				
Unskilled	ns	ns	ns	ns
Semi-skilled	ns	ns	0.17	ns
Skilled, Manual	ns	ns	ns	ns
Skilled, Non-Manual	0.30	0.20	-0.20	-0.20
Other Professional, Non-Manual	0.31	0.23	-0.24	-0.19
Professional, Non-Manual	0.45	0.31	-0.28	-0.25
Mother's Highest Qualification Level (none)				
Other Professional/Misc.	ns	ns	ns	ns
Vocational	ns	ns	ns	ns
16 academic	0.17	0.15	-0.15	-0.13
18 academic	0.31	0.22	-0.25	-0.21
Degree or equivalent	0.47	0.36	-0.40	-0.37
Higher degree	0.54	0.35	-0.43	-0.36
Marital Status of Parent/Guardian/Carer (married)				
Single	-0.13	ns	0.21	0.15
Separated/Divorced	ns	ns	0.21	0.18
Living with partner	-0.18	-0.13	0.21	0.14
Widow/Widower	ns	ns	ns	ns
Home Learning Environment				
Early Years Home Learning Environment (HLE) Index (Grouped) (Very low)				
Low (Index values: 14-19)	0.15	0.13	ns	ns
Average (Index values: 20-24)	0.17	ns	ns	ns
High (Index values: 25-32)	0.32	0.27	-0.25	ns
Very high (Index values: 33-45)	0.48	0.30	-0.35	ns
Early years HLE (Continuous scale)	N/A	N/A	N/A	-0.12*

Neighbourhood influences

Various measures of neighbourhood disadvantage were also tested to see if they predicted students' social-behavioural outcomes at age 14, while controlling for the effects of individual, family and HLE measures discussed above. There was evidence that the level of overall disadvantage in the neighbourhood, measured by two national measures, the Index of Multiple Deprivation (Noble et al., 2004) and the Income Deprivation Affecting Children Index (IDACI) scores, as well as other area based measures such as lower participation in employment, the incidence of crime, and the incidence of limiting long-term illness in the population, all predicted poorer social-behavioural outcomes for the EPPSE sample in KS3.

Living in a neighbourhood with higher levels of deprivation among children aged under 16 on the IDACI predicted poorer 'self-regulation', and higher levels of 'hyperactivity' and 'anti-social' behaviour. Higher neighbourhood scores for the IMD predicted increased 'hyperactivity'. Higher levels of criminality in neighbourhoods predicted poorer outcomes in all four social-behavioural domains (e.g., ES=0.14 for 'hyperactivity'). Higher levels of unemployment in the area likewise predicted higher 'hyperactivity' among Year 9 EPPSE students. Finally, a higher incidence of limiting long-term illness in the neighbourhood predicted lower 'self-regulation' at the end of Key Stage 3. All these relationships had effect sizes in the range of 0.08 to 0.14 (for imputed data) after controlling for the influence of individual, family and HLE factors discussed above.

Educational experiences from pre-school to secondary school

EPPSE investigated the impact of educational environments from the pre-school to primary school in shaping students' social-behavioural outcomes at age 14.

Pre-school influences

In order to assess whether the impact of early educational settings on social behaviour continued throughout Key Stage 3, we tested measures related to pre-school: exposure (i.e., attended pre-school or not), duration, quality and pre-school effectiveness.

The results indicate that attending just any pre-school centre did not predict social-behavioural outcomes in Year 9. Further, the influence of pre-school effectiveness measures was no longer visible at age 14, in contrast to findings when the EPPSE sample were in primary school. However, the quality of the pre-school setting as measured by the Early Childhood Environment (ECERS) observational scales continued to be significant for all four social-behavioural outcomes at the end of Key Stage 3, both unconditionally and when tested in combination with the quality of early years HLE.

Overall, students who had attended higher quality pre-schools still showed significantly better social-behavioural outcomes at age 14 than the home group or than those who had experienced only low quality pre-school. These relatively small effects were consistent in predicting better outcomes, for 'self-regulation' (ES=0.14 high quality versus home group), 'pro-social' (ES=0.14), 'hyperactivity' (ES= -0.13) and 'anti-social' (ES= -0.14) behaviour.

The results suggest that the effects of pre-school may be partly dependant on other experiences such as the quality of the early years HLE. Having attended a medium or higher quality pre-school showed lasting benefits for students from most HLE groups. For those who had attended a low quality pre-school who were also from a low or average HLE group, there were significant positive benefits for 'self-regulation' and 'pro-social' behaviour (ES=0.50 for 'self-regulation').

For hyperactivity only high quality pre-school offered benefits for students from a low early years HLE group (ES= -0.40). For those who had a high early years HLE, however, low quality pre-school did not seem to offer extra benefits in terms of predicting better social-behavioural outcomes in Year 9. This pattern fits with predictions made of interactions between home and out-of-home pre-school experiences by Melhuish (1991) and findings of interactions when the EPPSE students were in primary education during Key Stage 2 (Sammons et al., 2008a; 2008b).

In combination with the findings for academic outcomes (Sammons et al, 2011a) the results suggest that higher quality pre-school experiences can have lasting positive benefits for all round development, although by age 14 these effects are relatively modest for social behaviour. We

conclude that pre-school experience on its own, while of benefit, should not be regarded as a magic bullet to overcome the long lasting effects of disadvantage, but may provide help to ameliorate its impact, particularly if of high quality.

Primary school influence

There were no statistically significant effects of the academic effectiveness of the primary school an EPPSE student had attended in terms of predicting better later social-behavioural outcomes at the end of KS3. This is in contrast to findings for academic attainment where we have identified longer term positive benefits from attending a more academically effective primary school that remain statistically significant in predicting academic results in Year 9 (Sammons et al. 2011a).

Secondary school influences

Secondary school academic effectiveness and school quality measured by Ofsted inspection

Two administrative indicators of school effectiveness and quality are provided by i) the DfE Contextual Value Added (CVA) measures calculated to measure secondary school effectiveness in promoting students' academic progress from KS2 to KS4 and ii) the Office for Standards in Education (Ofsted) inspection grades for schools.

EPPSE tested whether students who attended more effective or higher quality secondary schools (as defined by these indicators) in KS3 showed better social-behavioural outcomes.

The four year average CVA score for secondary schools did not predict differences in students' social-behavioural outcomes in KS3 either positively or negatively, when account was taken of the influence of individual student, family, HLE and neighbourhood factors. However, the overall Ofsted inspection judgments of the secondary school for their measure of 'behaviour of learners' did predict better social-behavioural outcomes for EPPSE students. The differences were primarily distinguished between a satisfactory, good or outstanding secondary school and an inadequate one. Students who had the misfortune to attend a secondary school that had been judged inadequate on at least one occasion in the four years studied, by contrast, showed significantly poorer social behaviour, taking into account the influence of other factors (e.g., ES ranged between 0.56 and 0.63 for attending a satisfactory, good or outstanding school versus an inadequate one for 'self-regulation').

As well as identifying a net effect after controlling for other influences, interaction effects were also studied. These showed that attending an 'outstanding' or a 'good' school offered the greatest benefits in promoting better social behaviour outcomes to students with lower scores on the multiple disadvantage index, those from non manual family SES groups and those whose mothers had higher qualification levels. At secondary level therefore, attending a better secondary school seems to have relatively more benefit for those students who are from relatively more advantaged backgrounds compared to those who are relatively more disadvantaged. This is in contrast to findings at younger ages which indicated that the disadvantaged children benefited more from attending higher quality pre-schools and more academically effective primary schools.

School level social composition

School level social composition was measured by the percentage of students' eligible for Free School Meals (FSM) and the percentage of students with SEN. Neither of these aggregate measures were significant predictors of social-behavioural outcomes at KS3. These findings are in contrast to the results for academic outcomes in Year 9 where attending a secondary school with a more disadvantaged intake had a weak but negative impact on EPPSE students' own attainment levels.

Students' experiences and views of secondary school

Homework

Students' self reported time on homework strongly predicted better social-behavioural outcomes in Year 9. This relationship held even when taking into account other individual student, family and HLE influences (2-3 hours per night had ES=0.72 'self-regulation', ES=0.62 'pro-social', ES= -0.71 'hyperactivity' and ES= -0.55 'anti-social'). The positive impact of spending time on homework for social-behavioural outcomes mirrors results found for academic attainment at this age. It mirrors

other research which has pointed to the reciprocal links between behavioural patterns including effort and motivation that predict attainment. Of course it must be recognised that spending time on homework is a form of self-regulated behaviour in itself, and can be seen to demonstrate higher levels of motivation and commitment to school work, and also possible family support and encouragement to take study seriously. Also it is likely that a teacher may be positively influenced by whether a student completes homework when assessing their behaviour and their attainment.

In interpreting this finding it should also be remembered that some schools lay more emphasis on setting and marking homework and thus school processes may also be at work in shaping students' attitudes to and engagement in homework.

Taken together with the positive findings on these students' English, maths and science attainment and their academic progress across KS3 (where significantly better outcomes were predicted by spending more time on homework) the results for social behaviour also point to the benefits of encouraging students to spend time on completing homework. It is likely to foster better study skills and motivation, encourage independent learning and, through the extra time spent on study, increase the opportunity to learn in KS3. Other research reviews on the impact of homework have pointed to its benefits for academic outcomes at secondary level but have rarely explored the relationships with social behaviour (but see Ramdass & Zimmerman, 2011).

Teaching and school processes in KS3

Students' views about their secondary school education in KS3 were obtained from self report questionnaires. Various measures were derived that related to features of their school experiences (Sammons et al., 2011 b).

Where students reported that their schools laid a greater 'emphasis on learning', this predicted better 'self-regulation' (ES=0.17 for imputed data) and to a lesser extent 'pro-social' behaviour (ES=0.16 for imputed data) and reduced negative behaviour also (ES=-0.20 'hyperactivity', ES=-0.16 'anti-social' on imputed data). Elsewhere, we have shown that this 'emphasis on learning' factor (a measure of the quality of teaching derived from the student's perspective) also predicted better educational attainment in KS3, after taking into account other background influences.

'Teacher support' (where students reported teachers supporting their learning) also predicted better social behaviours (e.g., ES=0.17 'self-regulation', ES=-0.20 'hyperactivity'). This factor measures teacher behaviours such as providing helpful comments on students' work, use of praise, formative feedback and making lesson aims clear. It is therefore another measure that relates to the quality of teaching experienced by students.

A 'negative behavioural climate' in the secondary school, as reported by students, also predicted poorer social-behavioural outcomes at age 14. It predicted poorer outcomes in 'self-regulation' (ES=-0.32) and 'pro-social' behaviour (ES=-0.26) and increased scores for 'hyperactivity' (ES=-0.31) and 'anti-social behaviour' (ES=0.25).

Similarly, the factor 'valuing pupils' was found to predict better outcomes for all four social-behavioural measures. This factor captures aspects of the emotional climate of the school, such as relationships with teachers in terms of friendliness and the extent to which students feel valued and involved.

The headteacher's leadership qualities were also important as these predicted better social-behavioural scores for the all four outcomes (ES=0.09 to ES=0.13 for imputed data). Again these findings of weak to modest positive effects are in line with those found in analysing academic outcomes in KS3. The effects were not strong and other literature suggests that 'headteacher leadership' tend to operate indirectly to benefit student outcomes through improving the school behavioural climate, school organisation and teaching quality that may be hypothesised to have a direct impact on student outcomes (see Day et al., 2009; Leithwood et al., 2006; Robinson, 2008; Sammons et al., 2011c).

The higher the quality of the 'physical environment of the school' (attractive buildings, classroom decorations, and standards of cleanliness) predicted better social-behavioural outcomes for 'pro-

social' (ES=0.10) and reduced 'anti-social' behaviour (ES=-0.07), controlling for the influence of other background influences. Similarly 'school learning resources', as rated by students, predicts better outcomes for all four social-behavioural measures (ES=0.12 to ES=0.15 for imputed data). Again though weak these results show that, taking account of other influences, student behaviour tends to be better in secondary schools that are more favourably resourced in terms of science laboratories, the library and the computer resources.

Student dispositions

Previous research has shown that there are reciprocal relationships between academic self-concepts and attainment (Marsh & Craven, 2006). Higher self-concept predicts better attainment and vice versa. Earlier patterns of attainment and self concept can shape students' future identities as learners. EPPSE has shown (Sammons et al., 2011a) strong links between 'academic self-concept in maths' as a predictor of maths attainment in Year 9, although 'academic self-concept in English' was a less strong predictor of Year 9 English attainment. We tested whether these measures that we term students' 'dispositions' also predict differences in their social-behavioural outcomes as rated by teachers in Year 9.

The results indicate stronger positive effects for 'academic self-concept' in maths as a predictor of 'self-regulation' and 'pro-social' behaviour than for 'academic self-concept in English'. In addition, higher scores on these two measures of 'academic self-concept' predicted reductions in negative behaviour for both 'hyperactivity' and 'anti-social' behaviour. Due to the likely reciprocal nature of relationships between academic self-concept, attainment and behaviour it is not possible to infer causal connections. Nonetheless, the results suggest that efforts to improve attainment and academic self concept of students in secondary schools are also likely to promote better social-behavioural outcomes and vice versa.

'Enjoyment of school' can be viewed as an important educational outcome in its own right and contributes to student well-being. 'Enjoyment of school' as reported by students' consistently predicted better social-behavioural outcomes. 'Enjoyment of school' has also been shown to predict better academic outcomes in KS3. These findings are relevant to policy makers and practitioners because they show that improving attainment and social-behavioural outcomes is not at variance with higher levels of student reported 'enjoyment of school'.

Developmental progress across KS3

Individual and family factors

A significant gender gap was identified, with girls showing more progress in the positive social-behavioural outcomes (ES=0.34 'pro-social', ES=0.20 'self-regulation'), and also greater reductions in the negative outcomes (ES=-0.17 to 0.34 imputed data). The occurrence of behavioural problems in early childhood was also a significant predictor of students' ability to make developmental progress in all four investigated social-behavioural domains across KS3 (ES=-0.18 to ES=0.27). Conversely, the relative age position within their cohort (e.g. Autumn born and therefore older) did not predict social-behavioural changes for students during KS3.

A moderate equity gap associated with family socio-economic status was found for changes in 'self-regulation' (ES=0.28), and 'pro-social' (ES=0.22) and 'anti-social' behaviour (ES=0.27) placing students of parents in professional non-manual occupations in a clearly advantaged position. The gaps were smaller for 'hyperactivity' (ES=-010) and 'anti-social' behaviour (ES=-011).

A consistent pattern of differences in developmental progress, related to the level of mother's educational qualifications, emerged for 'self-regulation'(ES=0.31 for higher degree), 'pro-social' and 'anti-social' behaviour, with students of mothers holding a degree or equivalent, or a higher degree, showing significantly greater improvements in the two positive social-behavioural outcomes, and significant reductions in 'anti-social' behaviour (ES=-0.28 for higher degree), compared to students of mothers with no qualifications.

The marital status of parents was not significantly associated with improvements in 'self-regulation' or 'pro-social' behaviour. However it did predict increases in 'hyperactivity' (ES=0.15) and 'anti-social' behaviour (ES=0.13). Students in lone parent families showed small but statistically significant increases in both negative behaviours, and students of divorced or separated parents were found to show increased scores for 'anti-social' behaviour between Year 6 and Year 9, controlling for other influences.

Home Learning Environment (HLE)

The quality of the early years HLE was found to predict better developmental progress across KS3. A high or very high quality of the early years HLE was significantly associated with improvements in 'self-regulation' (ES=0.32) and 'pro-social' behaviours (ES=0.22) from Year 6 to Year 9, with significant reductions in 'hyperactivity' (ES=-0.20). However, the quality of the early years HLE did not predict any significant reductions in 'anti-social' behaviour during KS3.

Secondary school influences

Several major features of teaching and school processes in secondary schools were found to influence students' social-behavioural developmental progress across KS3. One first important feature was the 'emphasis on learning', a factor related to those teaching strategies designed to promote critical reasoning and the activation of higher-order cognitive processes. The second was the amount of 'teacher support' given. This included clearly defined learning targets, expectations and constructive feedback. A third feature was the extent to which the secondary schools provided good 'learning resources', such as well-equipped computing laboratories, and well-resourced libraries. A fourth, concerned the culture of valuing students, typified by the extent to which teachers and the school management accept feedback and input from students, offer them friendly and respectful treatment, and are not felt to put too much stress on GCSE examination results.

All of these factors predicted significant improvements in 'self-regulation' and 'pro-social' behaviour and also significant reductions in 'hyperactivity' and 'anti-social' behaviour across KS3, after allowing for socio-economic and demographic influences, and the quality of early years HLE.

A fifth domain captured the negative behavioural climate in the secondary school and included disruptive behaviours, violent confrontations, possession of weapons by students, lack of discipline and abidance by school rules, and a strong anti-school ethos whereby students who work hard are given a hard time by other students. Higher scores for this factor predicted significant declines in students' levels of 'self-regulation' and 'pro-social behaviour', and significant increases in 'hyperactivity' and 'anti-social behaviour' across KS3.

Overall, these results show that a number of features of secondary school processes predict variation in students' social-behavioural development across KS3. Individual student, family and HLE factors play a role in shaping changes in students' social behaviour, with a tendency for the equity gap in behavioural outcomes to widen for some groups of students during early adolescence.

In addition, features of the secondary school environment relating to the 'emphasis on learning', 'teacher support', the 'learning resources' and 'behaviour climate' also predict changes in EPPSE students' social behaviour. How students' experience their secondary schools predicts both social-behavioural outcomes and development and, as we report elsewhere, also their academic attainment and progress from Year 6 to year 9.

Conclusions

Overall, the analyses provide clear evidence concerning the factors that predict better social-behavioural outcomes for students at the end of KS3 and the factors that predict developmental change in adolescence measured from Year 6 to Year 9.

It is apparent that the influence of various individual, family and HLE factors continue to shape students' social behaviour in secondary school. An equity gap can be identified in terms of factors that promote learning and academic attainment as well as better social adjustment. The experience of multiple disadvantage in the early years increases the risk of poorer social-behavioural development up to age 14 years, as well as predicting poorer attainment. The two are likely to be mutually reinforcing. By contrast positive parenting experiences especially in the early years helps to promote better longer term outcomes. There remains evidence that pre-school experiences continue to shape social-behavioural outcomes into secondary school, although only the measure of pre-school quality shows a statistically significant relationship at age 14.

The measure of primary school academic effectiveness predicted better attainment in Year 9 but not better (or worse) social behaviour. Similar results are found for the academic effectiveness of the secondary school. However, a poor quality secondary school as measured by Ofsted judgments predicts poorer behavioural outcomes for those unfortunate enough to attend a school rated as inadequate, even controlling for the influence of individual, family and HLE factors.

Measures of the 'quality of teaching' and of the 'leadership' of the school and its 'behavioural climate', 'physical environment' and 'learning resources' (as rated by students) were found to be consistent predictors of better social-behavioural as well as academic outcomes. Likewise, time spent on homework (as reported by students), strongly predicts better academic and social-behavioural outcomes. These findings highlight areas that could be addressed in policies intended to promote better outcomes for secondary school students. They also point to the potential value of listening to the student 'voice' in assessing the quality of their educational experiences. The aspects about secondary school experience identified here show the importance to school leaders and teaching staff of focusing on enhancing the quality of teaching and learning, student support, improving the behavioural climate of the school, ensuring students feel valued, and promoting a high quality physical environment and learning resources. These aspects should be viewed as key features for school self-evaluation and planning for improvement as well as for external evaluation.

INTRODUCTION

Background: The EPPSE 3-14 Project

The Effective Pre-school, Primary and Secondary Education 3-14 (EPPSE 3-14) project is a large-scale longitudinal study exploring the effects of educational provision at various phases, from pre-school to the end of Key Stage 3 (KS3, age 14), across a nationally representative sample of approximately 3,000 children (see Sylva et al., 1999). This study was commissioned in 1997 and funded by the Department for Education and Skills (now the Department for Education).

The original Effective Provision of Pre-school Education (EPPE 1997 - 2004) project was the first study of pre-schools in Europe to adopt a longitudinal, mixed-methods, educational effectiveness design, based on sampling children in a range of pre-school settings and using statistical approaches that enable the identification of individual pre-school centre and later school effects (Sammons et al., 2005, 2010). The original aim of the project was to investigate which types of early childhood provision were most effective in promoting children's academic attainment and social-behavioural development at entry to primary school (age 5), and to what extent these effects persisted to the end of Key Stage 1 (age 7 plus years). During this initial phase, information was collected from 2,857 children aged 3 plus attending 141 pre-school centres selected from five regions across England, drawn from a representative range of types of pre-school providers, including local authority day nurseries, integrated centres (which combine education and care), playgroups, private day nurseries, nursery schools, and nursery classes (see Sammons et al., 2002a; 2003, Sylva et al., 2010). A further 'home' sample, consisting of 315 children with minimal or no pre-school exposure, was added at entry to primary school bringing the total sample to 3,172 children.

An extension of the original EPPE study (EPPE 3-11, 2008 - 2011) followed the sample to the end of Key Stage 2 (Sammons et al., 2007a; 2007b; 2008a; 2008b; Sylva et al., 2010). During this second phase of the longitudinal research, children's academic and social-behavioural development was investigated across Key Stage 2 of primary education (age 7 to 11 years). It explored the impact of a wide variety of child, parent, and family factors, including the early years home learning environment (HLE), as well as measures of primary school academic effectiveness, on pupils' academic and social-behavioural outcomes during this phase of education.

This third phase of the study (EPPSE 3-14) investigates the continued impact of demographic, socio-economic, and educational influences from pre-school to primary and secondary school on adolescents' academic attainment and social-behavioural development across KS3 in secondary school. The results on academic attainment and progress are reported in Sammons et al., (2011a). The current report describes the influences on social-behavioural outcomes in Year 9, as well as on developmental progress across KS3. The separate report on students' social-behavioural developmental pathways between Year 1 of primary school across 5 time points to the end of KS3, is summarised in the EPPSE 3-14 Final Report (Sylva et al., 2012).

Aims

EPPSE 3-14 has investigated the influence of demographic, socio-economic, individual background and educational influences from pre-school to primary and secondary school on adolescent's social-behavioural outcomes at the end of KS3 (Year 9). In addition EPPSE has explored the effects, on social-behavioural outcomes, of students' self-reported experiences in secondary education and outside school, their academic self-concepts and emotional dispositions. The EPPSE 3-14 study also investigated the influences on developmental progress across KS3.

The study collected information on students' background circumstances in Year 9; indicators of the effectiveness and quality of their secondary school; assessments of their behaviour from teachers; students' reports of their own educational and personal experiences, as well as national indicators and census statistics regarding their neighbourhood.

The specific research aims were to:

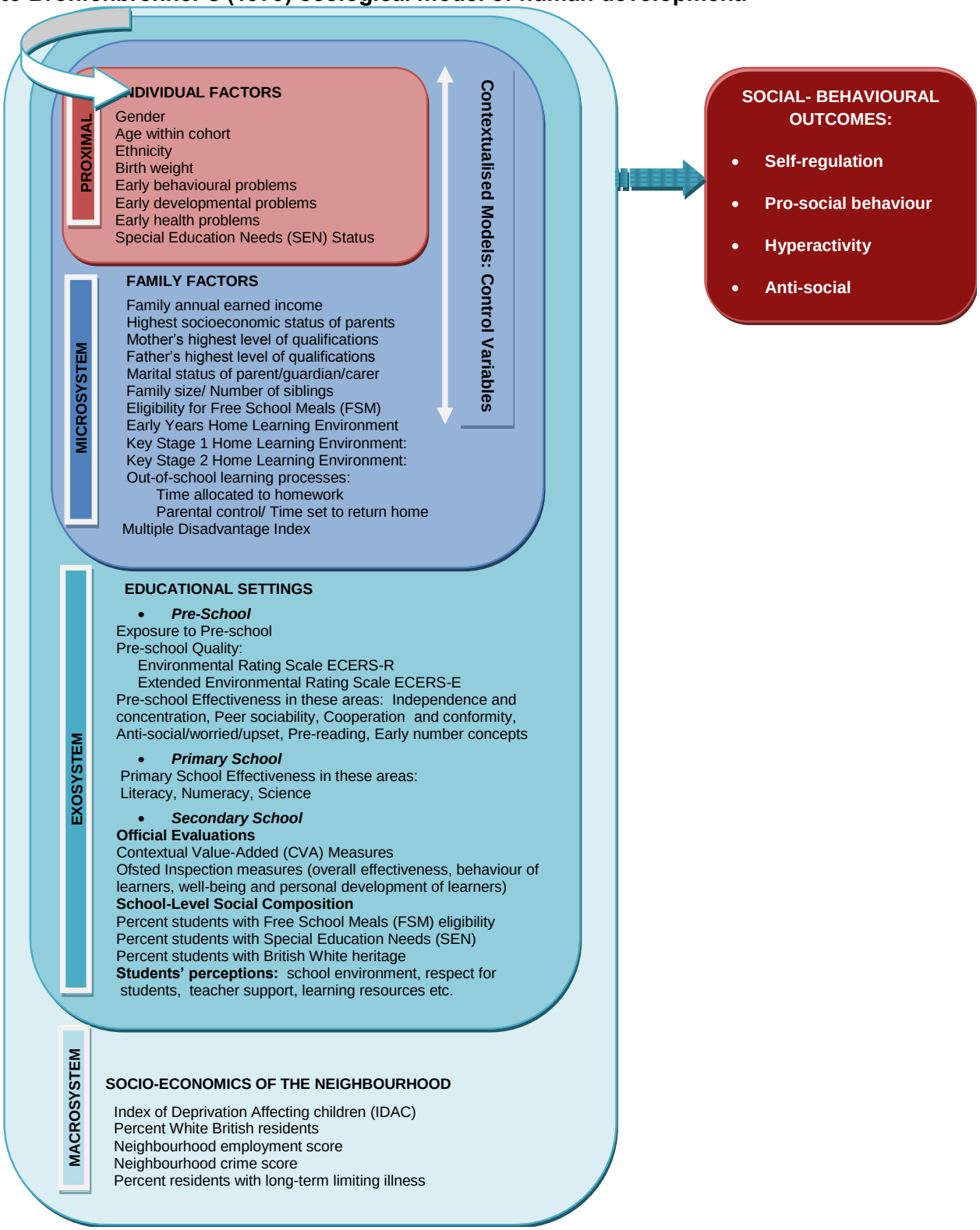
- investigate students' social-behavioural outcomes at the end of KS3 based on analyses of teacher completed rating scales;
- identify which background characteristics, individual, family and HLE factors predicts social-behavioural outcomes;
- explore the influence pre, primary and secondary school, particularly in terms of quality and effectiveness on later social-behavioural outcomes and developmental progress;
- examine the combined influence of pre-school characteristics with the HLE as predictors of social-behavioural outcomes at age 14 to establish to what extent any continuing pre-school effects are dependent upon other experiences such as the HLE;
- assess whether the continued impact of pre, and primary school influences on social behaviour differs for more and less disadvantaged students;
- explore the effects of teaching and school processes measured by students' report of their secondary school and classroom and their dispositions on social-behavioural outcomes in Year 9.

Analytical strategy and structure of the report

The theoretical framework of the study originates in the pioneering work of Bronfenbrenner (1979), who devised an ecological model of human development. This framework is consistent with the one used in our qualitative studies (see Siraj-Blatchford et al., 2011). EPPSE uses an adapted version of this model (summarized in Figure 1) to explore the impact of various spheres of influence on the social-behavioural development of young adults, from proximal factors which can be traced back to early childhood, to more distal, family-related factors, an exosystem consisting of educational influences, and a mesosystem of ecological correlates stemming from the residential neighbourhood.

In each section of the report, we discuss the theoretical underpinnings and potential mechanisms that link factors pertaining to each sphere of influence (proximal, distal, exosystem, mesosystem) to social-behavioural outcomes, while highlighting connections to the research literature.

FIGURE 1: Summary of the analyses strategy: Different groups of predictors tested in relation to Bronfenbrenner's (1979) ecological model of human development.



Source: Authors' adaptation of the ecological model of human development, based on Bronfenbrenner (1979); Bronfenbrenner & Morris (1998); Siraj-Blatchford et al. (2011).

This report is divided into seven sections.

Section 1 provides a descriptive analysis of the characteristics of the EPPSE sample in Year 9.

Section 2 explains the identification of the social-behavioural factors and their theoretical significance, and shows their distribution among students and across secondary schools at the end of KS3.

The aim of subsequent sections will be to present the analyses of advanced quantitative methodological approaches and statistical evidence in order to answer the key research questions.

Section 3 explores the impact of the socio-economic and demographic circumstances of individual students' on their social-behavioural development in Year 9, as well as potential effects of the HLE and out-of-school learning processes.

Section 4 focuses on influences from educational environments, and seeks to establish whether there are any enduring effects related to the quality and/or effectiveness of pre- and primary school on social-behavioural outcomes at the end of Key Stage 3.

It also explores the educational influences of the secondary schools attended by EPPSE students, using effectiveness measures based on data from the National Pupil Database (NPD) and Ofsted inspection judgements of the quality of the secondary school. It also investigates educational influences and whether these are conditional upon, or moderated by, socio-economic factors. This helps explain any equity issues and how different groups of students are influenced by the quality of their schools. These analyses help to illuminate mutually reinforcing processes that impact on social-behavioural development, and explore the positive influences that could ameliorate the detrimental effects disadvantage.

Section 5 reports on measures from students' questionnaire self reports to offer a more comprehensive picture of the secondary education experienced by our sample. Additionally, the relationships between students' academic self-concept and dispositions and their social-behavioural outcomes in Year 9 are explored.

Section 6 considers the impact of various socio-demographic and educational factors on students' developmental progress (from Year 6 to Year 9) across KS3, to provide insights on aspects related to behavioural changes over time.

The concluding section summarizes the findings and discusses policy implications.

Methodology

Treatment of incomplete data

Incomplete data as a result of non-response or attrition in surveys are a ubiquitous problem in social research, with longitudinal studies in particular being subject to such limitations. One major challenge to any longitudinal study is 'tracking' children when they move home or more importantly when they move between phases of education (pre-school to primary school, primary school to secondary school). Tracking involves identifying new school and establish contacts with new teachers or other members of staff who have sufficient knowledge of the students to provide complete and reliable behavioural assessments. This process inevitably results in some lose of data due to the complexity of secondary school and teachers' lack of familiarity with the project.

In order to mitigate the methodological consequences arising from missing data and to maximize the usability of our collected data, EPPSE used to two approaches for treatment of incomplete data. One approach is *multiple imputation*, while the other is *Full-Information Maximum Likelihood Estimation* (FIML). This reflects the increasing recognition among quantitative researchers that these methods are more statistically principled than ad-hoc methods such as single-imputation methods (e.g., mean substitution, last observation carried forward), treating missing observations as a separate category, or listwise deletion.

Multiple imputation

Multiple imputation is a statistical procedure resulting in data augmentation. Its implementation consists in generating a number of simulations for missing data points through repeated draws from a plausible distribution. The goal is to produce a complete data matrix amenable to analysis using conventional statistical techniques. Essentially, several replicas of the original dataset are created, with missing values being substituted by plausible values as determined by the statistical relationships posited in the specification of the imputation model (see Little & Rubin, 2002).

Statistical analyses are then conducted separately on each of the imputed datasets, and the estimates are subsequently pooled (i.e., averaged) across these datasets using Rubin's (1987) rules. Briefly, these rules stipulate that the simple arithmetic mean has to be computed for parameters such as coefficients, and a slightly more elaborate formula containing a multiplier should be used for ancillary statistics such as standard errors, to take into account both within- and between-imputation uncertainty surrounding the estimates. Multiple imputation is considered to produce more valid inferences regarding the statistical associations in the data by producing less biased estimates compared to pairwise deletion or mean substitution (Rubin, 1987).

There are several approaches to multiple imputation based on different assumptions about the distributional properties of the data. One main approach assumes a joint multivariate distribution of variables in the dataset, which is generally met by normally distributed continuous variables. Another approach is based on chained equations, relaxing the assumption of a joint multivariate distribution, and superseding it with a user-specified conditional distribution for the missing data in each incomplete variable. For each approach, there are several available software implementations.

EPPSE's choice of multiple imputation approach and software has been informed by rationales pertaining to both the distributional properties of our data and experiments (see Sammons et al., 2010) assessing the relative performance of various software implementations (compared to the estimates produced on a complete-case dataset) using different statistical packages: the standard -mi impute- routine and the user-contributed package -ice- (Royston, 2004) in Stata 11 (StataCorp, 2009); 'mi' (Su, Gelman, Hill & Yajima, 2011), 'mice' (Van Buuren & Oudshoorn, 2000), and Amelia II (Honaker, King, & Blackwell, 2009) [2] in R 2.1.3.0 (R Development Core Team, 2009); and PROC MI in SAS 9.2 (SAS Institute Inc., 2008).

Although both Amelia II in R and the user-contributed package -ice- in Stata performed very well, EPPSE opted for the Stata implementation of the chained equations approach. Several reasons

[2] Also available as a standalone package relying on on a graphical user interface.

have informed this choice. First, a large number of the variables in the dataset were discrete, i.e., measured on a binary, ordinal or categorical scale (for instance, the over 50 behavioural indicators used for operationalizing our dependent variables are measured on ordinal scales; socioeconomic status and parental educational qualifications were categorical variables), thus exhibiting significant departures from Normality. This implied that the assumption of a joint multivariate distribution was unwarranted for these variables. The chained equations approach, owing to its flexibility in allowing the specification of conditional distributions for the missing data, enabled us to customize the regression equation for each incomplete variable in the imputation model using the relevant predictors and the appropriate regression technique given the distributional properties of the variable (e.g., linear regression for continuous variables, binary logistic regression for dichotomous variables, ordinal logistic regression for variables measured on an ordinal scale, and multinomial logistic regression for variables measured on a categorical scale, respectively). For further details on the multiple imputation procedure see Appendix 1.

To adopt a conservative approach, two sets of parameters (the estimates obtained on the original data and the pooled estimates corresponding to imputed data, respectively) are reported throughout. Where the two sets of estimates are in agreement, greater confidence can be placed in the obtained results. It should be noted that it was not considered appropriate to impute missing data for certain measures such as Ofsted inspection judgments as these were school level measures. This affects the number of students in the analyses where these measures were included.

Maximum likelihood estimation

An alternative method for addressing the issues of incomplete data is based on Full-Information Maximum Likelihood Information. This method is available within the structural equation modelling framework. EPPSE used this approach in conjunction with confirmatory factor analyses (measurement equations for our dependent outcomes, and derivation of KS2 HLE). Unlike multiple imputation FIML does not produce several datasets but instead utilizes all available statistical information from the full sample in order to optimise our creation of factors for underlying data.

Statistical techniques

EPPSE applied a wide range of statistical techniques to model the relationship between various potential predictors that might influence student's social-behavioural development. In particular the research adopted multilevel models to take account of the clustered nature of the student sample in Year 9. Here the secondary school attended is treated as Level 2 in the analysis, while the individual student is treated as Level 1.

We investigate a range of continuous and categorical factors related to student, family, HLE, school and neighbourhood characteristics. Findings are reported in statistically significant point scores (for standardised outcomes) and also in Effect Size (ES). Although we use effect sizes to show the strength of influences, the nature of the research design does not allow us to demonstrate causality. Some relationships are likely to be reciprocal and we highlight this where appropriate. EPPSE shows the strength of associations in terms of what it means for students' social behaviour compared with others in the EPPSE sample (e.g. in percentile terms for the distribution).

SECTION 1: Characteristics of the sample at the end of Key Stage 3 (KS3)

Table 1. 1: Characteristics of the sample in Year 9

Variable/ Categories	COMPLETE DATA [1]		MISSING DATA [1]		IMPUTED DATA(Stata ICE)	
	N	%	N	%	Average N [2]	*Average %* [2]
Gender	**1,501**	***100.00***	**1,425**	***100.00***	**2,926**	***100.00***
Male	776	*51.70*	726	*50.95*	1,502	*51.33*
Female	725	*48.30*	699	*49.05*	1,424	*48.67*
Ethnicity	**1,501**	***100.00***	**1,422**	***100.00***	**2,926**	***100.00***
White UK Heritage	1,162	*77.42*	1,005	*70.68*	2,169	*74.13*
White European Heritage	41	*2.73*	62	*4.36*	103	*3.53*
Black Caribbean Heritage	44	*2.93*	62	*4.36*	106	*3.63*
Black African Heritage	27	*1.80*	32	*2.25*	59	*2.02*
Any other ethnic minority	32	*2.13*	43	*3.02*	75	*2.57*
Indian Heritage	23	*1.93*	33	*2.32*	62	*2.12*
Pakistani Heritage	77	*5.13*	78	*5.49*	155	*5.30*
Bangladeshi Heritage	12	*0.80*	20	*1.41*	32	*1.10*
Mixed race	77	*5.13*	87	*6.12*	164	*5.61*
Child Developmental History	**1,471**	***100.00***	**1,387**	***100.00***	**2,926**	***100.00***
No developmental problems	1,297	*88.17*	1,205	*86.88*	2,560	*87.50*
1 developmental problem	154	*10.47*	169	*12.18*	332	*11.34*
2+ developmental problems	20	*1.36*	13	*0.94*	34	*1.16*
Child Behavioural History	**1,471**	***100.00***	**1,387**	***100.00***	**2,926**	***100.00***
No behavioural problems	1,299	*88.31*	1,228	*88.54*	2,586	*88.37*
1 behavioural problem	140	*9.52*	134	*9.66*	282	*9.63*
2+ behavioural problems	32	*2.18*	25	*1.80*	59	*2.00*
Free School Meals (FSM) status	**1,488**	***100.00***	**1,242**	***100.00***	**2,926**	***100.00***
Not eligible for/recipient of FSM	1,232	*82.80*	974	*78.42*	2,370	*80.98*
Eligible for/recipient of FSM	256	*17.20*	268	*21.58*	556	*19.02*
English as additional Language (EAL) support	**1,481**	***100.00***	**276**	***100.00***	**2,926**	***100.00***
Does not receive EAL support	1,471	*99.32*	275	*99.64*	2.909	*99.41*
Receives EAL support	10	*0.68*	1	*0.36*	17	*0.59*
SEN status in Year 9	**1,389**	***100.00***	**238**	***100.00***	**2,926**	***100.00***
Not on SEN Register	1,154	*83.08*	183	*76.89*	2,354	*80.44*
School Action	117	*8.42*	23	*9.66*	272	*9.28*
School Action +	65	*4.68*	24	*10.08*	176	*6.01*
Full Statement	53	*3.82*	8	*3.36*	125	*4.27*
Mother's highest qualification	**1,445**	***100.00***	**1,370**	***100.00***	**2,926**	***100.00***
No qualifications	272	*18.82*	313	*22.85*	619	*21.16*
Other professional/miscellaneous	25	*1.73*	17	*1.24*	43	*1.47*
Vocational	223	*15.43*	196	*14.31*	437	*14.92*
16 Academic	533	*36.89*	522	*38.10*	1,096	*37.44*
18 Academic	128	*8.86*	111	*8.10*	247	*8.43*
Degree or equivalent	195	*13.49*	158	*11.53*	361	*12.32*
Higher degree	69	*4.78*	53	*3.87*	125	*4.25*
Father's highest qualification	**1,467**	***100.00***	**1,385**	***100.00***	**2,926**	***100.00***
Absent Father	328	*22.36*	359	*25.92*	706	*24.14*
No qualifications	224	*15.27*	225	*16.25*	464	*25.86*
Other professional/miscellaneous	25	*1.02*	16	*1.16*	32	*1.09*
Vocational	277	*12.07*	149	*10.76*	333	*11.39*
16 Academic	338	*23.04*	311	*22.45*	666	*22.76*
18 Academic	109	*7.43*	100	*7.22*	214	*7.31*
Degree or equivalent	188	*12.82*	170	*12.27*	365	*12.46*
Higher degree	88	*6.00*	55	*3.97*	146	*4.98*
Highest Family SES (KS2)	**1,489**	***100.00***	**1,412**	***100.00***	**2,926**	***100.00***
Unemployed/ Not Working	225	*15.11*	267	*18.91*	497	*17.00*
Unskilled	30	*2.01*	27	*1.20*	47	*1.62*
Semi-Skilled	123	*8.26*	130	*9.21*	255	*8.71*
Skilled Manual	207	*13.90*	200	*14.16*	410	*14.00*
Skilled, Non-Manual	238	*15.98*	263	*18.63*	505	*17.25*
Other Professional, Non-Manual	504	*33.85*	415	*29.39*	928	*31.70*
Professional, Non-manual	162	*10.88*	120	*8.50*	285	*9.73*
Family Annual Earned Income	**1,225**	***100.00***	**1,109**	***100.00***	**2,926**	***100.00***
No Salary	277	*22.61*	279	*25.16*	732	*25.00*
£ 2,500 – 15,000	224	*18.29*	246	*22.18*	612	*20.91*
£ 17,500 – 27,500	213	*17.39*	190	*17.13*	506	*17.22*
£ 30,000 – 35,000	155	*12.65*	112	*10.10*	326	*11.13*
£ 37,500 – 66,000	248	*20.24*	218	*19.66*	559	*19.11*
£ 67,500 – 132,000	108	*8.82*	64	*5.77*	194	*6.63*

Variable/ Categories	COMPLETE DATA [1]		MISSING DATA [1]		IMPUTED DATA(Stata ICE)	
	N	%	N	%	Average N [2]	*Average %* [2]
Marital Status of Parent (K22)	**1,777**	***100.00***	**928**	***100.00***	**2,926**	***100.00***
Single	174	*14.78*	158	*17.03*	512	*17.50*
Married	795	*67.54*	581	*62.61*	1,852	*63.30*
Separated/ Divorced	62	*5.27*	66	*7.11*	189	*6.46*
Living with partner	136	*11.55*	109	*11.75*	338	*11.55*
Widow/ Widower	10	*0.85*	14	*1.51*	35	*1.19*
Family Size/ Number of Siblings	**1,182**	***100.00***	**929**	***100.00***	**2,926**	***100.00***
No Siblings	153	*12.94*	118	*12.70*	370	*12.63*
1 Sibling	589	*49.83*	434	*46.72*	1,365	*46.64*
2 Siblings	278	*23.52*	240	*25.83*	722	*24.67*
3 or more Siblings	162	*13.71*	137	*14.75*	470	*16.06*
Early Years HLE	**1,441**	***100.00***	**1,360**	***100.00***	**2,926**	***100.00***
Early Years HLE: 0 – 13	126	*8.74*	145	*10.66*	295	*10.09*
Early Years HLE: 14 – 19	315	*21.86*	305	*22.43*	654	*22.36*
Early Years HLE: 20 – 24	316	*21.93*	357	*26.25*	700	*23.91*
Early Years HLE: 25 – 32	478	*33.17*	426	*31.32*	936	*31.97*
Early Years HLE: 33 – 45	206	*14.30*	127	*9.34*	342	*11.66*
Index of Multiple Disadvantage	**1,393**	***100.00***	**1,310**	***100.00***	**2,926**	***100.00***
0 Risk Factors	340	*24.41*	278	*21.22*	657	*22.46*
1 Risk Factor	390	*28.00*	348	*26.56*	788	*26.93*
2 Risk Factors	305	*21.90*	267	*20.38*	619	*21.17*
3 Risk Factors	170	*12.20*	188	*14.35*	393	*13.44*
4 Risk Factors	106	*7.61*	124	*9.47*	257	*8.77*
5+ Risk Factors	82	*5.89*	105	*8.02*	212	*7.23*
Pre-school quality - ECERS-R	**1,501**	***100.00***	**1,425**	***100.00***	**2,926**	***100.00***
No quality (i.e. home children)	134	*8.93*	163	*11.44*	297	*10.15*
Low quality (Lowest 20%)	204	*13.59*	204	*14.32*	408	*14.01*
Medium Quality (Middle 60%)	844	*56.23*	720	*50.53*	1,564	*53.55*
High Quality (Highest 20%)	319	*21.25*	338	*23.72*	657	*22.28*
Pre-school quality - ECERS-E	**1,501**	***100.00***	**1,425**	***100.00***	**2,926**	***100.00***
No quality (i.e. home children)	134	*8.93*	163	*11.44*	297	*10.15*
Low quality (Lowest 20%)	210	*13.99*	200	*14.04*	410	*14.01*
Medium Quality (Middle 60%)	838	*55.83*	729	*51.16*	1,567	*53.55*
High Quality (Highest 20%)	319	*21.25*	333	*23.37*	652	*22.28*
Ofsted Inspection judgment: secondary school [3]	**1,274**	***100.00***	**1,203**	***100.00***	**2,477**	***100.00***
Outstanding	196	*15.38*	133	*11.06*	329	*13.28*
Good	282	*45.68*	603	*50.12*	1,185	*47.84*
Satisfactory	365	*28.65*	328	*27.27*	693	*27.98*
Inadequate	131	*10.28*	139	*11.55*	270	*10.90*

For additional notes on the distribution of the sample see Appendix 1.

SECTION 2: Social-behavioural outcomes at Key Stage 3 (Year 9, age 14)

This section discusses the empirical strategy used for the operationalisation and measurement of social-behavioural outcomes in Year 9 and examines connections between the EPPSE measures of social behaviour and existing research. The section also describes the findings and summarizes the distribution of the four social-behavioural outcomes across student groups at the end of Key Stage 3 (KS3). Statistical analyses that investigate the impact of a range of explanatory factors that predict students' social-behavioural outcomes in Year 9 will be investigated in later sections.

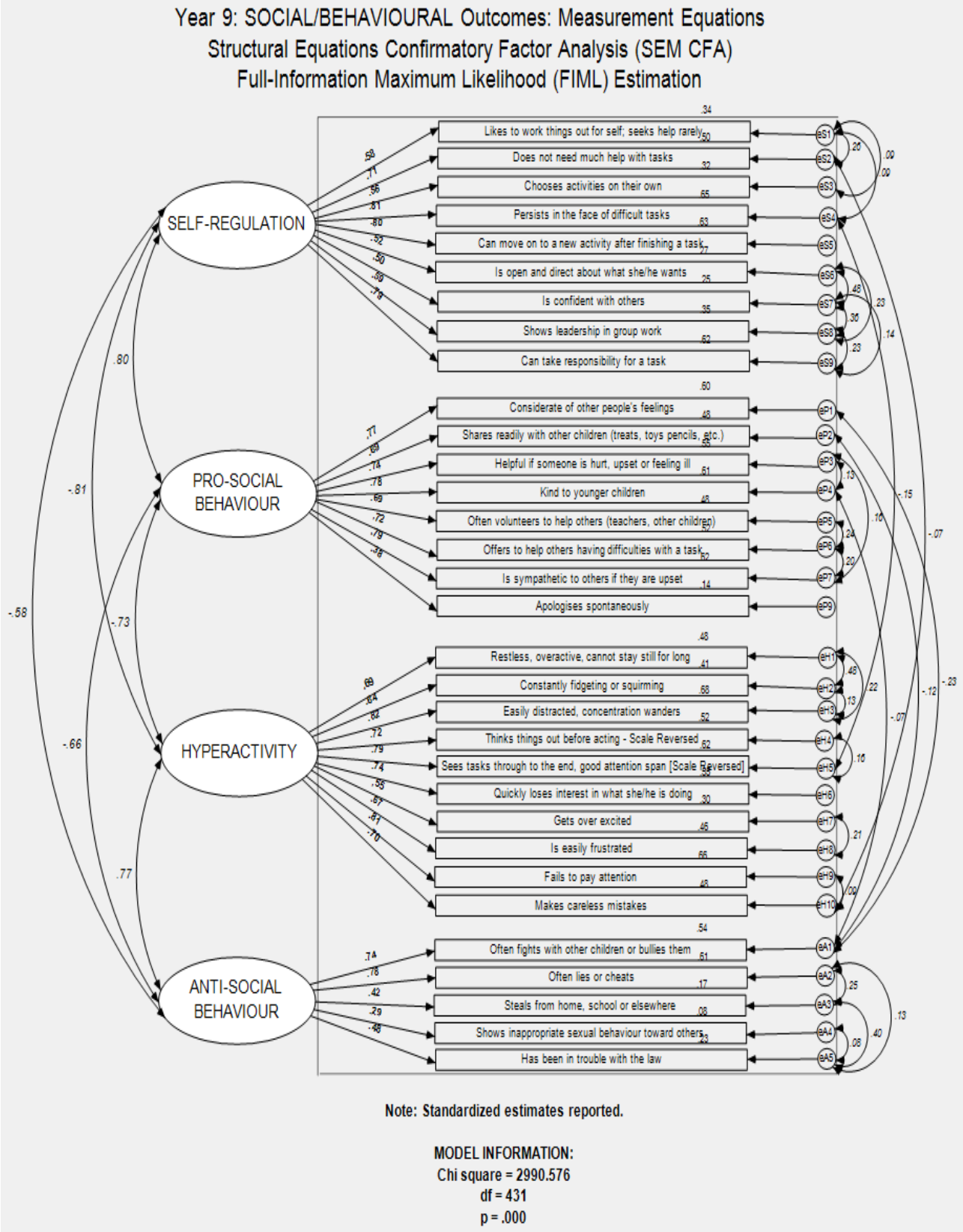
Social-behavioural outcomes are more difficult to conceptualise than academic attainment, and as such they do not lend themselves straightforwardly to quantification. It is necessary to devise measures of social behaviour that are well anchored in previous theoretical and empirical research in order to establish a common benchmark against which to asses students' behavioural outcome using internal standardisation so comparisons can be made across the different domains of social behaviour.

2.1. Creating measures of social-behavioural outcomes in Year 9

The main data source of information on students' social-behavioural outcomes in Year 9 was from ratings made by someone in school who knew the student well. This was usually the Form/Class or Year teacher. Consistent with social-behavioural measurement at previous time points (Years 1, 2, 5, and 6; see Sammons et. al., 2008b, p. 8), the Pupil Profile used to collect this information was based on the Goodman (1997) S*trengths and Difficulties Questionnaire* (SDQ). This instrument captures general behavioural patterns exhibited by students in educational settings. Teachers assessed students' behaviours on a range of items on a three-point scale. The SDQ was supplemented with additional items to create a behavioural profile of students consistent with earlier time points. The additional questions covered indicators measuring self-confidence and assertiveness ('is open and direct about what he/she wants'), leadership abilities, ability to work independently and to switch to a new activity upon completion of a task, perseverance in the face of difficulties, peer empathy ('is sympathetic if someone is hurt/ upset'), impulsiveness ('is impulsive, acts without thinking'), and a potential indicator of juvenile delinquency ('has been in trouble with the law') to reflect an updated perspective on behavioural issues relevant to the adolescent age. A list of the survey items is shown in Figure 2.1.1.

The same factorial clustering of items that emerged at earlier time points was adopted to ensure consistent theoretical conceptualization and high reliability for the social-behavioural outcomes. This enabled changes over time to be explored (see Sammons et. al., 2007b; 2008b). The analyses presented here retain four out of the seven factors: *Self-regulation*, *Pro-social behaviour*, *Hyperactivity* and *Anti-social behaviour*. The rationale behind this is twofold: first, these factors span aspects relevant to both social interactions and academic processes; second, they capture positive as well as negative features of students' behaviour as judged by teachers

FIGURE 2.1.1: Measuring social-behavioural outcomes in Y9: Structural Equations Confirmatory Factors Analysis



'Self-regulation' includes behaviours such as perseverance in the face of difficulties (standardised factor loading λ = .81)[3], the ability to switch to a new activity upon completion of a task (λ = .80), and taking responsibility for a task (λ = .79). 'Not needing need much help with tasks' is a characteristic

[3] Standardised factor loadings (λ [lambda] coefficients) indicate marginal change in the level of the observed variable, in standard deviation units, associated with a one standard deviation increase in the value of the latent variable.

of self-regulated students (λ = .71), as are leadership abilities (λ = .59) and self-reliance in undertaking academic tasks ('likes to work things out for self; seeks help rarely', λ = .58). Self-regulated students tend to show self-confidence and appropriate assertiveness ('is open and direct about what s/he wants') in their relationships with others (corresponding standardised factor loadings are .50 and .52, respectively).

'Pro-social behaviour' indicates a strong sense of peer empathy when seeing others in distress ('is sympathetic to others if they are upset', λ = .79), and being helpful in such situations (λ = .74). Further, pro-social students are considerate (λ = .77), showing kindness towards younger children (λ = .78). Volunteerism is also an aspect of pro-social behaviour ('offers to help others having difficulties with a task, λ = .72; 'often volunteers to help others (teachers, other children)', λ = .69).

'Hyperactivity' links with behavioural traits related to cognitive processes, such as distractibility ('easily distracted, concentration wanders', λ = .82), short attention span and failure to carry tasks through completion (λ = .79), inattentiveness (λ =.81), inconsistent, unsustainable motivation ('quickly loses interest in what she/he is doing', λ = .74), and inaccuracy ('makes careless mistakes', λ = .70). It includes behaviours that reflect social functioning: such as self-restraint ('gets over excited', λ = .55), impulsiveness (the opposite of 'thinks things out before acting'[4], λ = .72), proneness to frustration ('easily frustrated', λ = .67), hyperkinetic symptoms such as fidgeting, squirming (λ = .64) and restlessness (λ = .69).

'Anti-social behaviour' is characterized by poor responses to and relations with peers ('often fights with other children or bullies them', λ =.74), or displaying inappropriate sexual behaviour (λ = .29)[5]. Anti-social behaviours are also linked with dishonesty ('often lies or cheats', λ = .78), ('steals from home, school, or elsewhere, λ = .42). This range of behaviours can have serious implication for society ('has been in trouble with the law, λ =.48).

The interrelationships between social-behavioural outcomes in Year 9 are illustrated by correlations[6] shown in the Figure 2.1.1 by coefficients on the double-headed arrows.

The strongest correlation is between 'hyperactivity' and 'self-regulation' (r = -0.81), indicating that students with higher scores for 'hyperactivity' also show poorer 'self-regulation'.

'Self-regulation' is positively associated with greater 'pro-social' dispositions (r =0.80), and lower scores for 'anti-social' behaviour (r = -0.58).

Students with strong 'pro-social' dispositions will generally lack 'hyperactivity' symptoms (r = -0.73). Although 'pro-social' and 'anti-social' behaviour are as expected negatively correlated, 'pro-social' behaviour is not the diametric opposite of 'anti-social' behaviour (see Miles & Stipek, 2006), the correlation coefficient linking these outcomes is 0.66. Absence of 'pro-social behaviour' suggests a lack of social competence, but not necessarily aggressive or delinquent behaviour. There was a fairly strong positive association between 'hyperactivity' and 'anti-social behaviour' (r = 0.77).

For the purposes of the value-added and contextual value-added models in Section 6, the analyses replicated the SEM CFA analysis on the age 11 social-behavioural data collected from EPPSE students' Year 6 class teachers. This allowed for an investigation of changes in social-behavioural development across KS3 having established the same measures were evident at earlier time points, see Appendix 3.

[4] In Figure 2.1.1, the scale of this item (see 'seeks tasks through an end, good attention span' item) is reversed to run in a direction that is substantively consistent with the other indicator variables composing the latent factor measuring Hyperactivity.

[5] Inappropriate sexual behaviour is not a prominent component of anti-social behaviour, see low factor loading.

[6] The Pearson product-moment correlation coefficient (Pearson's *r*) is a measure of strength of unconditional linear dependence among variables, and is equal to the covariance between the variables, divided by the product of their standard deviations. Its values range between -1 and 1, with 0 indicating virtual linear statistical independence (but without ruling out the possibility of a non-linear statistical relationship, such as a quadratic or a cubic one, or a conditional linear relationship), -1 denoting a perfect negative and 1 denoting a perfect positive linear statistical association between variables, respectively.

The structural equations confirmatory factor analysis reported above suggests that extracted latent factors are in alignment with exploratory factor analyses conducted at earlier stages. Furthermore, these factors map well onto established theoretical concepts in social psychology and educational research.

2.2. Theoretical background to social-behavioural outcomes

This subsection shows how EPPSE's social-behavioural outcomes map onto existing concepts in academic research, serves as a theoretical framework which bridges the gap between the theoretical constructs and the empirical analyses. It also helps us to formulate a series of hypotheses about the likely influence of various socio-economic, environmental, and educational factors that were tested in subsequent sections.

'Self-regulation' is a concept of considerable complexity[7], and is important for academic achievement and social functioning. Aspects of 'self-regulation' include intellectual autonomy, good problem-solving abilities, adaptability, motivational aspects, as well as self-confidence, assertiveness, and leadership capabilities. According to the International Encyclopaedia of the Social & Behavioral Sciences (2004), self-regulation is defined as "one of the principal functions of the human self, [which] consists of processes by which the self manages its own states and actions so as to pursue goals, conform to ideals and other standards, and maintain or achieve desired inner states." (Baumeister, 2004, p.13859).

In the context of learning, 'self-regulation' is conceived of as "the self-directive process through which learners transform their mental abilities into task-related skills in diverse areas of functioning such as academia, sport, music and health" (Zimmerman 2004, p.13855). "Self-regulated learning is viewed as an activity that students do for themselves in a proactive way rather than as a covert event ..." (Zimmerman & Martinez-Pons, 2004.p.4). This behavioural trait involves a series of regulatory processes that control the acquisition of skills and knowledge, assist learners in navigating complex realities, and "greatly increase[s] the flexibility and adaptability of human behaviour, enabling people to adjust their actions to a remarkably broad range of social and situational demands" (Baumeister & Vohs, 2007, p.1). An observational definition is provided by Zimmerman (1990): accordingly, self-regulated learners "approach educational tasks with confidence, diligence, and resourcefulness [...] Unlike their passive classmates, self-regulated learners proactively seek information when needed and take the necessary steps to master it. When they encounter obstacles such as poor study conditions, confusing teachers, or abstruse text books, they find a way to succeed." (p. 4).

In addition to motivational aspects and proactive engagement in the systematic acquisition of information, 'self-regulation' also includes meta-cognitive aspects which enhance knowledge acquirement, such as planning, organising, goal-setting, self-monitoring, and developing strategies that optimise learning (Zimmerman, 1990). Self-regulated learners are differentiated from their less autonomous peers by the amount of time, effort, and concentration they are willing/capable to expend on cognitive tasks. 'Self-regulation' is therefore important in stimulating and propelling academic development, and associated with better academic performance; indeed, research shows that self-regulatory capabilities act as a strong mediator of socio-economic and educational influences in fostering academic attainment, and constitute an essential prerequisite for "succeeding against the odds" (Siraj-Blatchford et. al., 2011 forthcoming).
'Pro-social behaviour' is associated with a strong sense of peer empathy (Roberts & Strayer, 1996), evident during social interactions (considerate of others' feelings). It includes care for the welfare and of others and respect of their rights. It stands in close proximity to altruism and volunteerism. The research literature is populated with descriptions that include: "sharing, helping, defending, sympathy, rescue, cooperation" (Yarrow et al., 1976).

[7] Some researchers argue that self-regulation is divided into several aspects, something that more closely resembles a second-order factor. EPPSE treats self-regulation as a global concept, both for reasons of parsimony, and for substantive considerations, as the different aspects encapsulated in self-regulation are not strictly compartmentalised, but strongly interconnected.

Social psychologists have defined the pro-social personality as “an enduring tendency to think about the welfare and rights of other people, to feel concern and empathy for them, and to act in a way that benefits them” (Penner & Finkelstein, 1988). A shift from an egocentric to an altruistic focus via cognitive perspective-taking (Eisenberg et al., 1999), i.e., assuming the role of the other or retrieving information from memory to understand the other’s situation (ibid.), is considered to underpin the development of pro-social behaviours.

An emotional reaction is triggered in a pro-social person when another’s rights are transgressed which results in a desire to help the victim rather than acting as non-responsive bystanders. As children move into adolescence, this type of internalized concern for others becomes closely connected to “moral judgments” (Eisenberg et al., 1995), and is contingent on “levels of moral reasoning” (Wentzel et al., 2007) and adherence to social norms. As well as emotional factors, a series of cognitive factors grounded in rational processes underlie pro-social behaviour (Malti et al., 2009; Wentzel et al., 2007). Pro-social or cooperative forms of behaviour are central to the sound functioning of social groups, and harmonious interpersonal and group interactions. Miles & Stipek, (2006) argue that pro-social behaviour and cohesive classroom environments foster learning and may contribute to academic achievement through group support (see also McCafferty, 1990).

Pro-social skills have been linked to a range of positive outcomes, including adjustment capabilities, high levels of educational attainment, positive self-concept, emotional well-being, and stable employment (Miles & Stipek, 2006).

‘Hyperactivity’ involves complex behaviours which overlap cognitive and behavioural processes. Previous research indicates there is an “intrinsic relationship between attention and cognitive and behavioural functioning” which “makes it difficult to disentangle behavioural from cognitive symptoms” (Riccio, Gonzales & Hynd, 1994, p. 311).

The systematic relationship between hyperactivity/inattentiveness and diminished academic performance is consistently reported in the academic literature (Merrell & Tymms, 2001), and has prompted some researchers to conclude that “hyperactivity [...] reliably predicts academic underachievement” (Saudino & Plomin, 2007, p. 972).

In addition to heredity factors, two main explanatory accounts have been given for the negative association between hyperactivity and cognitive attainment (Saudino & Plomin, 2007). On the one hand, hyperactive behaviour adversely affects students’ capacities to develop and sustain attention and motivation, by translating into attention deficiencies, distractibility (Carlson, Jacobvitz, & Sroufe, 1995), low adaptability and lack of persistence (Kerr & Michalski, 2007), and organizational difficulties that interfere with task management and completion (Zentall et al., 1993), which in turn produce impairments in the academic functioning of students. On the other hand, frustration associated with difficulties with school work and lower attainment may be externalized through hyperactive behaviour (Saudino & Plomin, 2007). This suggests possible reciprocal influences, potentially resulting in a negative downward spiral.

‘Hyperactivity’ also includes conduct problems triggered by reduced self-control. For instance, hyperactive students will typically be prone to impulsive and externalizing behaviours. This impulsiveness inhibits deliberation and judicious decision-making, and can affect relationships with others. Although there is no consensus in the literature, ‘hyperactivity’ has been conceptualized by some as a mediator of ‘anti-social’ behaviour (see Schmitz, 2003).

To summarise, high levels of ‘hyperactivity’ can prove a severe liability in and out of school both socially and academically. For this reason, hyperactivity constitutes a major concern to parents, educators, and policymakers.
‘Anti-social behaviour’ involves characteristics that relate to both content or type for instance: verbal versus non-verbal abuse; psychological as opposed to physical aggression, or some combination of these. It also includes such behaviours as aggressiveness resulting in harmful actions and is measured by: intensity, frequency, and duration (short-term violence, as opposed to long-term bullying see Mooij, 1999).

Whereas temporary, situational anti-social behaviour is quite common among adolescents, persistent, stable 'anti-social' behaviour usually occurs only in extreme cases (Moffitt, 1993). Regardless of the forms of expression, these types of disruptive behaviours pose difficulties for teachers and parents alike, and are detrimental to both the victim (Farrington, 1993) and the perpetrator (Mooij, 1999). There is also evidence that bullies are also more likely to be bullied, again suggesting reciprocal relationships (Kallestad, 2002; Kallestad & Olweus, 2003; Olweus,1995).

At adolescence, students' abilities for self-evaluation and reflection increase (Miles & Stipek, 2006), at the same time as higher academic requirements are made by schools. Poor academic performance can lead to increased levels of frustration that may promote aggressiveness in vulnerable students (ibid.); and these changes may exacerbate anti-social behaviour, especially among at-risk students.

'Anti-social' behaviour has enduring effects, and can develop into criminality in adult life (Farrington, 1993; Moffitt, 1993; Mooij, 1999). Indeed, adolescents who engage in bullying and other types of aggressive behaviour seem to share similar background and academic characteristics with adult criminals: "Like offenders, bullies tend to be drawn disproportionately from lower socio-economic-status families with poor child-rearing techniques, tend to be impulsive, and tend to be unsuccessful in school." (Farrington, 1993, p. 383). The identification and successful management of 'anti-social' behaviour at early stages can prevent juvenile delinquency and prospective adult criminality and related societal problems.

The academic literature points to the importance of studying both social behaviour and academic attainment and their relationships in order to promote better all round development and well being and longer term educational success for students.

Social-behavioural patterns may facilitate or inhibit academic achievement, which in turn can modify behaviours and social functioning, and have long-term consequences for students' developmental pathways. Thus "children's social behaviour can promote or undermine their learning, and their academic performance may have implications for their behaviour as well as their opportunities to develop social relationships and skills." (Miles & Stipek, 2006, p. 103).

2.3. Variation between students in their social behaviour

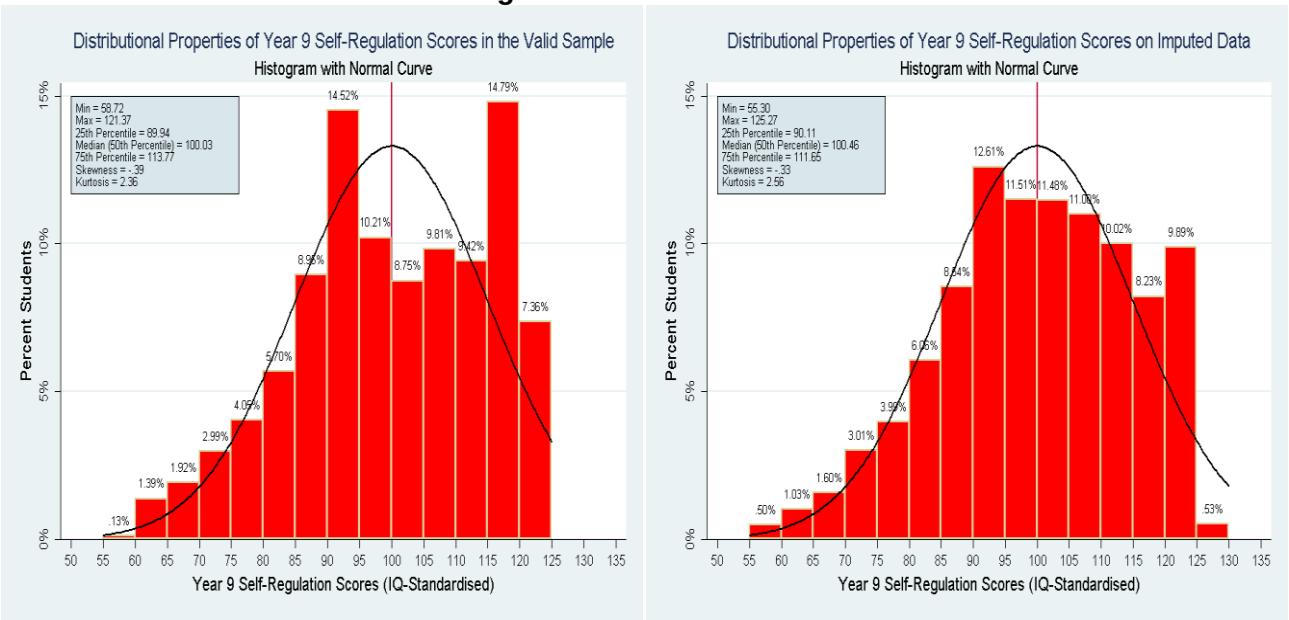
EPPSE's analyses strategy treat the sample average score as a measure of the typical behaviour of an average student in Year 9 for 'self-regulation', 'pro-social' behaviour, 'hyperactivity' and 'anti-social' behaviour (given the sample is broadly nationally representative). This value is set as the behavioural *benchmark* for comparisons among Year 9 students and across secondary schools. EPPSE conducted an IQ-standardisation of the original latent factor scores, with a mean of 100 indicating the average level of the considered type of social-behavioural outcome, and a standard deviation of 15. A score of around 115 indicates a student with a specific behavioural outcome one standard deviation above the mean. Correspondingly, a score of 85 denotes a student one standard deviation below the sample average.

When examining the distribution of the four social behavioural for the sample in Year 9 both original data (i.e. the valid sample), and those for the larger sample where we imputed missing data (shown as pooled estimates corresponding to models separately estimated on ten multiply imputed datasets) are reported.

The distribution of individual student level scores is shown in pairs of histograms in Figures 2.3.1 - 2.3.4 (original complete sample and imputed data). The red vertical line on the graphs indicates the baseline for comparisons (a score of 100, which is the sample average, roughly corresponding to the grand mean across secondary schools). Vertical bars represent the proportion of students within each segment of the distribution, considered in increments of 5 (corresponding to 1/3 of a standard deviation from the sample mean). For instance 14.5% of the students have 'self-regulation' scores between 95 and 100 on the non-imputed data. Finally, the graphs contain a superimposed Normal curve, and parameters characterizing the Normality of the distribution (skewness and kurtosis) are reported in addition to the score range and the location of the 25^{th}, 50^{th}, and 75^{th} percentiles.

'Self-Regulation'. The individual variations in 'self-regulation' among Year 9 students are summarized in Figure 2.3.1. As a general characteristic, a bimodal tendency can be observed on non-imputed data (double-peaked distribution); the scores tend to more closely approximate a Normal distribution on the imputed data.

FIGURE 2.3.1: Distribution of self-regulation scores



Cumulatively, approximately 28 per cent of the students in our valid Year 9 sample have 'self-regulation' scores within one standard deviation above the mean; on the imputed data, the estimated proportion of such students is 32.5 per cent. Exceptionally high levels of 'self-regulation', ranging between one and two standard deviations above the mean[8], are displayed by 22 per cent of the students in the valid sample, and 18.7 per cent on the multiply imputed data.

Average to relatively low 'self-regulation' levels (within one standard deviation below the baseline) are shown by a third (33.7%) of the Year 9 students in the valid sample and similar to the proportion of students on the imputed data is very similar (32.7%). Just 12.7 per cent of the students within the valid sample are rated as having very low levels of 'self-regulation' (within one and two standard deviations below the mean), and a corresponding 13 per cent of the imputed data fall within this category. The percent of students displaying extremely low 'self-regulation' (below two standard deviations from the mean) is just 3.4% on the valid sample (3.1% on the imputed data). The rightward skewness of the distribution shows that teachers generally rate students as above-average (rather than below average) for 'self-regulation' in Year 9.

[8] On the valid sample, the maximum self-regulation score does not exceed 2/3 of a standard deviation above the grand mean.

'Pro-social behaviour'. In the analyses a bimodal tendency is found, but to a lesser extent than for 'self-regulation' scores for the valid sample which is a departure from Normality not replicated on the imputed data.

FIGURE 2.3.2: Distribution of pro-social behaviour scores

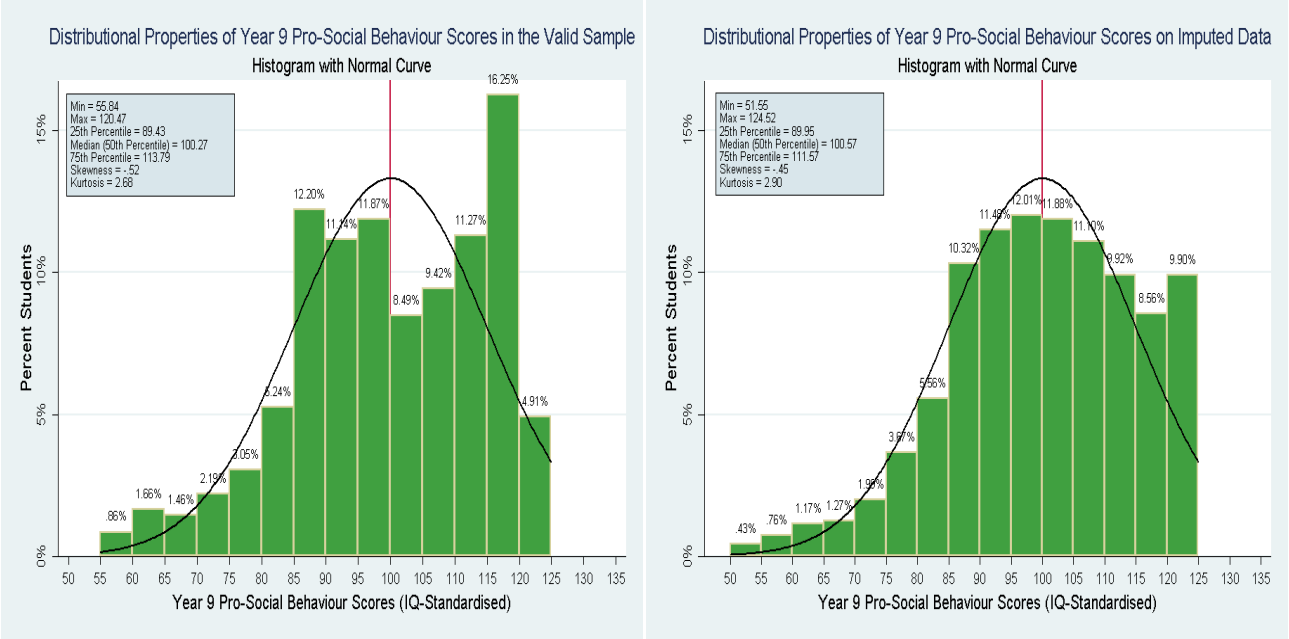


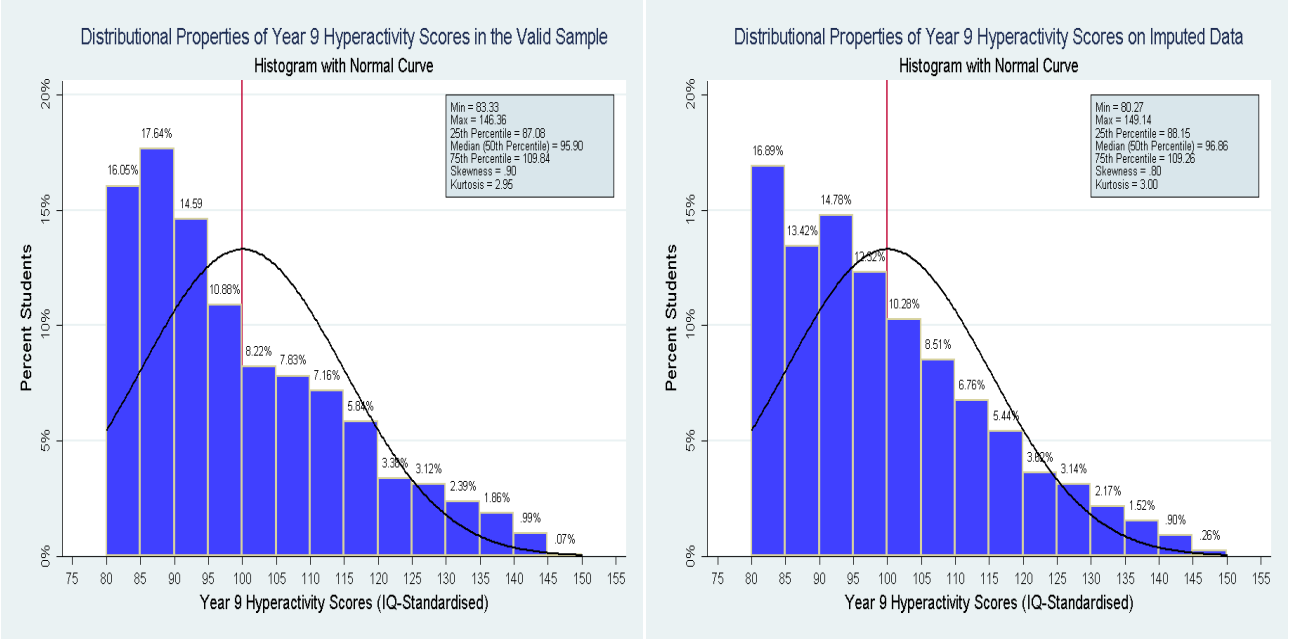
Figure 2.3.2, indicates that nearly one in three (29.2%) of the students show 'pro-social' dispositions between average and one standard deviation above the mean in the valid sample; the corresponding proportion of students on the imputed data is 32.9%. Further, according to teachers' ratings, exceptionally high levels of 'pro-social' behaviour (of above one standard deviation), are displayed by 21.6% of the students in the valid sample (but for imputed data, the figure is a bit lower at 18.5%).

The percentage of students rated as having average to low levels of social competence is 35.2% for the valid data and 33.8% on the imputed. Overall around ten per cent (10.5% of the students in the valid sample, and11.2% on the imputed data), are rated as having very low levels of 'pro-social' behaviour, of between two and one standard deviations below the grand mean.

A small fraction of the students are rated as lacking empathetic abilities and consideration in their interactions with peers (not exceeding two standard deviations below the mean). This was 4.0% in the valid sample, and 3.6% on the imputed data. The distribution of 'pro-social' scores is asymmetrical, and negatively skewed again showing that higher-than-average levels of 'pro-social behaviour' were more frequently identified in teacher assessments in Year 9.

'Hyperactivity'. Hyperactivity/inattentiveness was absent in the majority of students. The relative frequencies associated with each segment of the hyperactivity scores distribution are given in Figure 2.3.3.

FIGURE 2.3.3: Distributions of hyperactivity scores



Approximately one quarter of students (23.21% in the valid sample and 25.6% on the imputed data), show levels of 'hyperactivity' between average and one standard deviation above the mean.

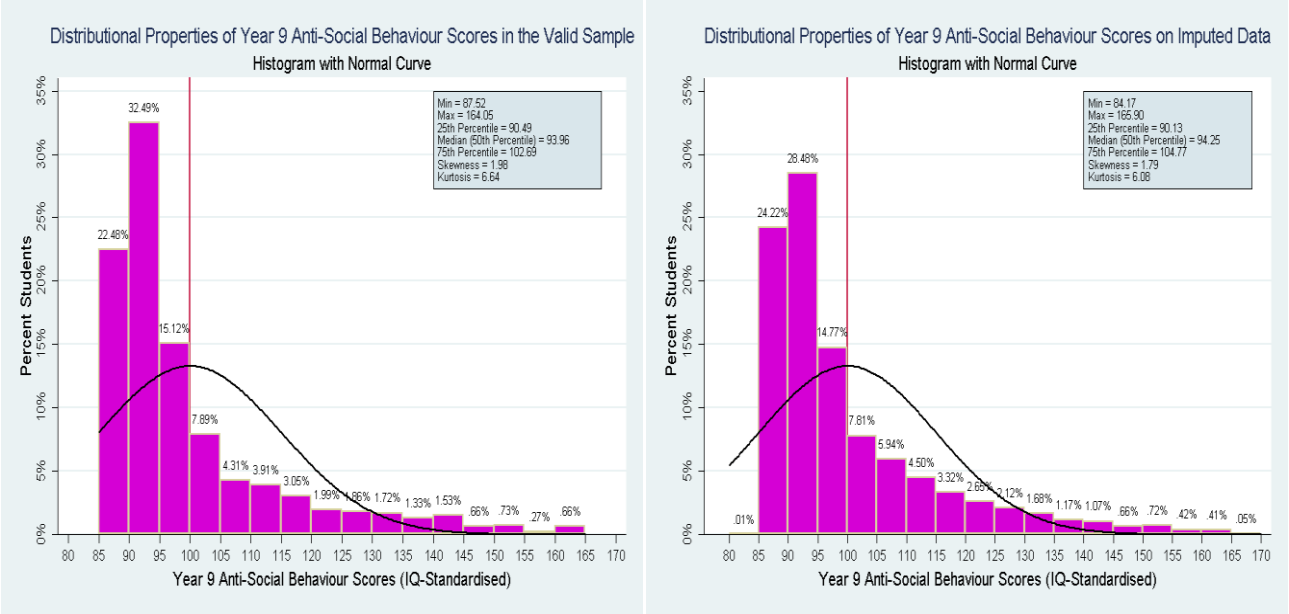
Students with high levels of hyperactivity (between one and two standard deviation above the mean) were 12.3% in valid sample, and 12.2% on the imputed data. A relatively small proportion of students (5.1% in the valid sample and 4.9% on the imputed data) are rated by teachers as exhibiting abnormal levels of hyperactivity/inattentiveness (above 2 standard deviations from the sample mean.

Almost 60% of the students on either type of data had below average scores for hyperactivity. Overall, 43.1% are rated between average and one standard deviation, and 16.1% between 1.33 and 1 standard deviations below average, in the valid sample (equivalent proportions on the multiply imputed data are 40.5%, and 16.99%, respectively).

The positively skewed distribution illustrates the relatively low incidence of higher-than-average hyperactive behaviour among Year 9 students.

'Anti-social behaviour'. Teacher's ratings of anti-social behaviour followed a censored Normal distribution, meaning that anti-social behaviours among students are the exception rather than the rule.

FIGURE 2.3.4: Distribution of anti-social behaviour



The majority of EPPSE students display low levels of aspects of anti-social behaviour. In all 70.1% in the valid sample and a similar proportion in the imputed data (67.5%) have anti-social behaviour scores between average and one standard deviation below average[9].

This implies than only three students out of ten showed some signs of anti-social behaviour. Among these, 16.1% within the valid sample and 18.3% within the imputed data has scores not exceeding one standard deviation above the mean, suggesting that their behaviour may be occasionally problematic, but is not particularly deviant. In all, 6.9% of the students for the valid sample displayed more anti-social-behavioural symptoms (ranging between one and two standard deviations above the baseline); the equivalent proportion on the imputed data is slightly higher[10], (8.1%).

In Figure 2.3.4 'anti-social' behaviour showed a heavily skewed distribution. The large positive skewness shows that secondary school students tend to be rated above average in terms of 'anti-social' behaviour and that the majority of the score values range below the sample mean. Among the negative social-behavioural outcomes, 'hyperactivity' is clearly more prevalent among students in secondary education compared to 'anti-social' behaviour.

Section 3 investigates the associations between various influences that may shape students' social behaviour in Year 9. It identifies which factors (individual, family HLE and educational) predict variations in students scores on the Year 9 teacher ratings for each of the four social behaviour and make comparisons about the strength of relationships in terms of effect sizes and other measures. It illustrates the strength of associations in terms of how this affects student's scores in the overall distribution (e.g. where it places a student in percentile terms such as to 10% or bottom 10% of the distribution). Although the strength of a relationship is identified it is not possible to draw firm causal connections.

[9] The minimum score on the imputed data is 84.15, which is slightly lower than one standard deviation below the mean, but only 0.01% of students on average across the ten multiply imputed datasets are assigned scores of below one standard deviation from the sample mean.

[10] Since students from disadvantaged backgrounds are generally more susceptible to attrition in longitudinal studies, there is a stronger likelihood that students with high scores on anti-social behaviour may have been lost from the sample. Therefore, a possible explanation for the fact that the analysis yields higher estimates of the proportion of students exhibiting relatively high levels of anti-social behaviour on the imputed data is that the multiple imputation procedure might have corrected the initial bias incurred by attrition.

SECTION 3: The influence of individual student, family factors, Home Learning Environment and homework on social-behavioural outcomes

This section explores the relationship between individual student, family, home learning environment characteristics and homework on social-behavioural outcomes in Year 9.

Section 3.1: The influence of student and family characteristics

EPPE has investigated the influence of demographic and socio-economic measures as predictors of students' behavioural outcomes at age 14. Student characteristics included: gender, age, ethnicity, early childhood behavioural history etc. Family factors included: family size (number of siblings), parents' marital status, family annual earned income, family highest socio-economic status (SES), as well as the highest level of parents' qualifications etc. School factors included Special Education Needs (SEN) status, and Free School Meals (FSM) eligibility etc. The two latter factors are explained below

The legal definition of *Special Education Needs (SEN)* status as set out in the 1996 Education Act states that children can be classified as having special education needs if they experience learning impairments which require special educational provisions to be made for them, specifically if they; display significantly greater difficulties in learning compared to children of the same age; have a disability that prevents them from making use of educational facilities generally available to similarly aged children. Additional regulations regarding the SEN status were incorporated into the legislative framework through the *Special Educational Needs and Disability Act* of 2001, explicitly prohibiting discrimination against disabled students in education. The SEN Code identifies three categories of interventions: *School Action* (SA) - where a student's makes insufficient progress, and consists of targeted measures such as different learning equipment or alternative learning strategies.
School Action Plus (SA+) - when SA measures have proven insufficient for adequate progress and external support is required from the Local Authority (LA). *Full Statement of SEN* – follows a statutory assessment carried out by the LA, indicating the student's needs and which provisions are required to meet these needs.

Free School Meals (FSM) eligibility requires that parents are in receipt of state benefits (income support, job seeker allowance, pension credit etc.). The eligibility for or receipt of FSM is widely used in educational studies as a proxy for social disadvantage/low socio-economic status/poverty.

Parental interviews during the pre-school phase of the study, and parent questionnaires in KS1 and KS2 also provided further information about child and family background. Teacher reports in the Year 9 Pupil Profile provided additional measures on FSM and SEN. Other administrative data sources have been used where information from parents and teachers was unavailable.

Following the analyses strategy used during the pre-school and primary phases of research contextualised multilevel statistical models were used to predict students' social behaviour at age 14. A subtype of hierarchical linear model referred to as a one-way analysis of covariance (ANCOVA) with random effects (Raudenbush & Byrk, 2010) was used. Detailed below are the results showing estimates and standard errors. Subsequent sets of results assume the reader has a broad familiarity with these procedures. It should be noted that certain pairs of predictors cannot be tested within the same model for statistical reasons such as multicollinearity[11]; further, from a substantive point of view, certain combinations of predictor categories may be incompatible. To avoid statistical problems incurred by data redundancy permutations of sets of explanatory variables, tested separately in parsimonious models were explored. Estimates of the original and the imputed data are shown using effect size (ES), demonstrating the strength of the predictors. In addition, an indication of what the pattern of results means in terms of students' behaviours is described. For example, indicating whether the differences might place a student in the bottom quartile or decile of the sample.

[11] Multicollinearity is a statistical phenomenon which arises whenever two or more explanatory variables in a statistical model are highly inter-correlated (in other words, they contain redundant information). Potential consequences of multicollinearity are high sensitivity of estimates to small changes in the model specification, computational difficulties associated with matrix invertibility, and lack of precision and numerical inaccuracy of the produced estimates.

Section 3.1.1: The influence of individual and family characteristics on self-regulation

TABLE 3.1.1.1: Contexualised Model 1: Self-regulation

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.023	***	0.818	0.46	6.676	***	0.558	0.49
Age within cohort	0.212		0.130	0.10	0.260	***	0.082	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	1.099		2.475	0.08	0.066		1.514	0.00
Black Caribbean heritage	-2.283		2.924	-0.17	-0.529		1.521	-0.04
Black African heritage	-2.183		3.602	-0.17	-2.824		1.961	-0.21
Any other ethnic minority	1.110		3.346	0.08	0.092		1.816	0.01
Indian heritage	3.814		3.367	0.29	3.773	*	1.942	0.28
Pakistani heritage	-2.942		2.510	-0.22	-0.432		1.321	-0.03
Bangladeshi heritage	5.698		4.812	0.43	4.080		2.711	0.30
Mixed race	-1.263		1.817	-0.10	-1.755		1.164	-0.13
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<= 1500 g)	4.930		3.937	0.38	-2.054		2.350	-0.15
Low birth weight (1501-2500 g)	-2.142		1.705	-0.16	-0.940		1.102	-0.07
Number of Siblings: Ref = No Siblings								
1 Sibling	1.618		1.261	0.12	1.492	*	0.906	0.11
2 Siblings	0.438		1.394	0.03	0.508		0.992	0.04
3+ Siblings	-0.078		1.629	-0.01	-0.666		1.181	-0.05
Early Behavioural Problems (Ref None)								
1 Behavioural Problem	-3.020	**	1.357	-0.23	-4.067	***	0.914	-0.30
2+ Behavioural Problems	-7.982	***	2.703	-0.61	-4.571	**	1.986	-0.34
Highest Family SES (KS2): Ref Unemployed/Not working								
Unskilled	-1.654		3.099	-0.13	-0.263		2.156	-0.02
Semi-Skilled	-2.033		1.918	-0.16	-1.030		1.207	-0.08
Skilled Manual	-0.651		1.733	-0.05	0.806		1.068	0.06
Skilled, Non-Manual	4.364	***	1.643	0.33	4.246	***	0.973	0.31
Other Professional, Non-Manual	2.736	*	1.513	0.21	4.369	***	0.967	0.32
Professional, Non-Manual	4.479	**	1.915	0.34	6.383	***	1.304	0.47
Mother's Highest Qualification (pre-school): Ref = None								
Other professional/ Misc.	2.457		3.215	0.19	3.673		2.260	0.27
Vocational	-0.521		1.540	-0.04	1.991	**	0.947	0.15
16 academic	1.867		1.324	0.14	2.878	***	0.793	0.21
18 academic	5.370	***	1.794	0.41	5.340	***	1.195	0.40
Degree or equivalent	7.012	***	1.677	0.53	7.606	***	1.142	0.56
Higher degree	8.990	***	2.269	0.69	8.744	***	1.687	0.65
Marital Status of Parent: Ref = Married								
Single	-2.825	**	1.320	-0.22	-1.818	**	0.904	-0.13
Separated/Divorced	0.311		1.843	0.02	-1.055		1.255	-0.08
Living with partner	-1.711		1.304	-0.13	-2.417	***	0.910	-0.18
Widow/ widower	-0.746		4.408	-0.06	-0.041		2.749	-0.00
Intercept	93.668	***	2.027		91.338	***	1.311	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.075	***	2.264		6.160	***	1.113	
Variance (Level 1)	172.053	***	4.024		182.313	***	2.614	
Total Variance	181.128				188.473			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9080.51				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.050				0.033			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.76				12.83			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	43.30				62.06			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	19.58				16.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Gender. In line with findings at earlier stages (Year 6; see Sammons et. al., 2008b), there are statistically significant gender differences in 'self-regulation' in Year 9, even when other individual and family background influences are accounted for. Boys tend on average to show levels of 'self-regulation' of more than 1/3 of standard deviation lower than those of girls. This represents approximately 6 points (plus or minus 1.60 at a 95% confidence level[12]) on the original data, and slightly larger (6.7 points) on the imputed data.

Age within year group. The deviation in months from the average age within a year group positively predicts better 'self-regulation' at KS3. Older students are rated by their teachers as exhibiting greater 'self-regulation', increasing by 0.26 points for each additional month (imputed data). The expected average difference in 'self-regulation' scores between the youngest and the oldest student in each year group is about 3.12, just over 1/5 of a standard deviation from the sample mean. On the non-imputed data, the coefficient measuring the impact of age within year group fails to reach statistical significance.

Birth weight. Similarly to the findings in Year 6, low birth weight (Scott & Carran's 1989) does not predict Year 9 students' 'self-regulation' scores (in contrast to findings on academic outcomes in Year 9, see Sammons et al., 2011a).

Ethnicity. When social background factors are controlled for, there is virtually no statistically significant variations by ethnic group for 'self-regulation' at the end of KS3, except for a minor tendency (only in the imputed data) for students of Indian descent to be rated more favourably in terms of 'self-regulation' compared to students of British White heritage. This difference is of approximately 3.8 points, amounting to slightly more than 20% of a standard deviation from the sample mean.

Student's behavioural history. Students who had shown behavioural problems in early childhood (parents' reports at age 3/5) continue to show poorer 'self-regulation' in Year 9. Thus, for identical socio-economic and demographic circumstances, students who have exhibited one behavioural problem during early childhood will on average have 'self-regulation' scores which are 3-4 points lower than students who had no reported behavioural problems in early years. Students who had two or more behavioural problems reported by their parents in early childhood had scores over a half of a standard deviation lower (8 points), than the same reference category (original data).

Family size. Family size (number of siblings) is not particularly significant for students' 'self-regulation' at KS3. The estimates produced on the imputed data point in the direction of a small difference in 'self-regulation' for singletons compared to students with only one sibling. Students with one sibling have better 'self-regulation' scores than only children (1.5 points higher, i.e. less than 10% of a standard deviation from the sample mean).

Family highest socio-economic status (SES). Table 3.1.1.1 shows an equity gap at the end of KS3, even when individual factors have been accounted for. Students from families whose highest socio-economic status was professional non-manual are rated significantly better in 'self-regulation' compared to students from families that were unemployed (moreover there are no differences in 'self-regulation' between those from unemployed or from unskilled or semi-skilled manual backgrounds).

The expected difference in 'self-regulation' scores between these categories of students amounts to 4.5 points on the original data, and 6.4 on the imputed data, i.e., between approx. 30%-42% of a standard deviation. Students whose parents belong to other socio-economic groups associated with higher occupational prestige, such as other professional non-manual, or the skilled non-manual categories, also tend to be positively and significantly differentiated from children of unemployed parents in teachers' ratings of 'self-regulation'.

[12] In linear regression, the upper and lower bounds of a 95% confidence interval are determined by multiplying the value of the standard error of the coefficient of interest by a factor of 1.96, and adding this product to the value of the least-square coefficient (for the upper bound) or subtracting it from the value of this coefficient (for the lower bound).

Parents' highest qualifications level. Mother's qualification level is highly predictive of student 'self-regulation'. All other things being equal a student whose mother holds a higher academic degree is on average rated almost 9 points higher on the 'self-regulation' scale (60% of a standard deviation).

These large differentials are confirmed by both the original and the imputed data. Thus, the maximum possible difference between a student whose mother holds a higher academic degree, and a student whose mother possesses no educational qualifications, is equivalent to the difference between an average student and a student positioned in the top 25% of the sample population or the difference between an average student and one in the bottom 25% of the distribution.

The expected differences in 'self-regulation' between students of mothers with no academic qualifications, and students of mothers holding a degree or equivalent, 16 or 18 years academic qualifications, a professional qualification, or having undergone vocational training, are increasingly higher, commensurate with mother's levels of educational qualifications.

While both maternal and paternal levels of educational attainment were found to be important in shaping a students' self-regulation over the long term. However, multicollinearity limit the possibilities of testing both mother's and father's academic qualifications as predictors within the same model,[13] so maternal and paternal educational qualifications were tested separately.

Mother's qualifications were found to be more systematically associated with students' levels of 'self-regulation' compared to father's qualifications. The difference in effect size between the higher levels of educational attainment and the absence of qualifications is consistently larger in the case of maternal academic qualifications on both the original and the imputed data. For instance, the effect size capturing the differential impact of a higher academic degree (in comparison to no qualification) is larger in magnitude in the case of the mother's qualification level, (0.69, compared with an ES of 0.59 for father's highest qualification level on the original data, and a similar pattern was found for the imputed data, 0.65 versus 0.55).

Marital status of parents. Marital status appears to have an enduring impact on students' 'self-regulation' through to the end of KS3. Lone parenthood predicts poorer 'self-regulation', taking account of other individual and family factors. Year 9 students of single unmarried parents (during the early years) were rated less highly than their peers who have married parents, although the differences are relatively small. The difference in 'self-regulation' between these two categories is on average 2.8 points on the original data, and could reach up to 5.4, i.e. 1/3 of a standard deviation (ES is -0.22 on the original data, and -0.13 on the imputed data).[14]

Students whose parents were cohabitating in the early years also had lower 'self-regulation' by 2.4 points (equal to 16% of a standard deviation) compared to students in married couple families, according to the estimates on the imputed data (these estimates did not reach statistical significance in the original data).

[13] A simple bivariate contingency table (statistical output not reported for reasons of space) indicated that parents' spouse or partner selection generally occurs within the same or proximate levels of educational qualifications, yielding empty cells, or cells containing one or very few observations, as certain combinations of parental academic qualifications levels occur highly infrequently or fail to occur altogether. For instance, the combination involving a mother holding a higher degree and a father having no educational qualification resulted in an empty cell, as no observations in the dataset simultaneously matched both criteria. Other highly infrequent combinations of parental qualifications in our sample are: mother higher degree – father other professional (1 observation); mother higher degree – father 16 academic (2 observations); father higher degree – mother no qualifications (2 observations); father higher degree – mother other professional (2 observations); father higher degree – mother vocational qualification (3 observations); father higher degree – mother 16 academic (4 observations).

[14] Factors that we do not have access to in our data, but which can be expected to have an influence in determining the magnitude of these differences include (1) whether the married couple actually consists of the two biological parents of the student; and (2) the relationship of the primary carer with the non-resident parent.

Overall, the estimates reported in Table 3.1.1.1 show that among all explanatory variables, maternal educational qualifications, family socio-economic status, gender, and early childhood behavioural history, are the most prominent background factors that predict students' 'self-regulation' in Year 9.

Most of the differences associated with socio-economic status and mother's highest qualification level are statistically significant at $p < .001$ on both original and imputed data, meaning that there is a very low probability that these estimates could be the artefact of random variations in the sample.

An inspection of the random-effects parameters (level-1 and level-2 variance components) indicates that between 43.3% and 62.1% of the variations in 'self-regulation' across secondary schools are reduced when accounting for the explanatory factors included in the estimated model, showing that a substantial proportion of these school-level variations are attributable to socio-economic and demographic factors, as well as to the student's own behavioural history in early childhood.

A smaller share of variation at individual level is accounted for by all the predictors in the model (17.8% on the original data, and 12.8% on the imputed data, respectively).

TABLE 3.1.1.2: Contexualised Model 2: Self-regulation

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Individual and Family Factors Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.720	***	0.808	0.38	5.858	***	0.564	0.45
Age within cohort	0.222	*	0.126	0.11	0.212	***	0.080	0.10
Ethnicity: Ref = White UK heritage								
White European heritage	1.400		2.402	0.11	0.647		1.467	0.05
Black Caribbean heritage	-1.057		2.883	-0.09	0.318		1.486	0.02
Black African heritage	1.178		3.509	0.10	-2.353		1.869	-0.18
Any other ethnic minority	0.472		3.284	0.04	0.013		1.793	0.00
Indian heritage	2.705		3.364	0.22	3.724	**	1.811	0.29
Pakistani heritage	-3.232		2.537	-0.26	-0.565		1.309	-0.04
Bangladeshi heritage	5.468		4.519	0.45	3.671		2.493	0.28
Mixed race	-1.058		1.790	-0.09	-1.282		1.128	-0.10
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	1.851		4.076	0.15	-0.744		2.357	-0.06
Low birth weight (1501-2500g)	-1.686		1.661	-0.14	-0.364		1.158	-0.03
Number of Siblings: Ref = No Siblings								
1 Sibling	0.327		1.235	0.03	1.161		0.883	0.09
2 Siblings	-0.343		1.368	-0.03	0.485		0.945	0.04
3+ Siblings	-0.523		1.594	-0.04	-0.108		1.099	-0.01
SEN Status in Year 9: Ref = No SEN								
School Action	-13.989	***	1.583	-1.14	-9.831	***	0.994	-0.76
School Action +	-16.104	***	1.988	-1.31	-13.421	***	1.572	-1.04
Full Statement	-11.629	***	2.538	-0.95	-11.888	***	1.299	-0.92
Free School Meals (FSM) Eligibility	-3.373	***	1.302	-0.27	-2.820	***	0.821	-0.22
Receipt of EAL Support	-7.264		6.568	-0.59	-4.598		3.530	-0.36
Mother's Highest Qualification (pre-school): Ref = None								
Other professional/ Misc.	0.898		3.162	0.07	3.239		2.247	0.25
Vocational	-1.636		1.493	-0.13	1.902	**	0.949	0.15
16 academic	0.665		1.290	0.05	2.332	***	0.783	0.18
18 academic	4.455	**	1.738	0.36	5.488	***	1.175	0.43
Degree or equivalent	5.447	***	1.544	0.44	7.580	***	1.023	0.59
Higher degree	9.450	***	2.063	0.77	9.708	***	1.474	0.75
Marital Status of Parent Ref = Married								
Single	-2.570	**	1.235	-0.21	-2.289	***	0.772	-0.18
Separated/Divorced	2.230		1.772	0.18	-1.009		1.197	-0.08
Living with partner	-0.658		1.280	-0.05	-2.157	**	0.846	-0.17
Widow/ widower	0.233		4.108	0.02	-0.293		2.774	-0.02
Intercept	100.046	***	1.730		97.017	***	1.088	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.772	***	2.178		5.001	***	0.959	
Variance (Level 1)	150.966	***	3.685		166.552	***	2.528	
Total Variance	160.737				171.553			
Number of Level-1 Observations	1059				2930			
Number of Level-2 Units	347				775			
Deviance (-2 x Log Restricted-Likelihood)	8253.76				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.84				20.36			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	38.95				69.20			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	28.63				23.88			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Special Education Needs (SEN) status. Taking into account demographic and socio-economic factors such as gender, ethnicity, family size, eligibility for FSM, and maternal academic qualifications, students identified by teachers as showing a SEN, irrespective of particular type, have significantly poorer 'self-regulation' than students without SEN.

Students requiring special provisions such as School Action are on average rated almost 14 points lower (93% of a standard deviation) compared to those who are not on the SEN register on the original data, and 9.8 points lower on the imputed data. Students on School Action Plus are generally rated even lower compared to students without a record of SEN over 16 points lower on the non-imputed data (in other words exceeding one standard deviation by 6%), and 13.4 points lower on the imputed data.

Students with a Full Statement have on average 'self-regulation' scores of around one standard deviation lower compared to students with no SEN. It is worth noting that teachers who rated 'self regulation' would usually know which students have a SEN and the known link between such learning behaviours and attainment (see Anders et al 2010 for factors that predicted SEN status for the EPPSE sample in primary school).

Free School Meals (FSM) eligibility. Students living in disadvantaged families who are eligible for free school meals are rated approximately 1/5 of a standard deviation below those not eligible for FSM, taking account of other influences. As the corresponding effect sizes indicate, the equity gap, while clearly persistent by the end of K3, is not as strong a discriminating factor as academic or learning impairments.

The second estimated model that includes SEN indicators achieves a higher explanatory power at individual level, as it entails a much higher proportion of Level-1 variance reduction (27% on the original data) compared to the previous one (but a similar proportion of level-2 variance reduction). This suggests that SEN in particular is closely linked to the variation among individual students in teachers' ratings of 'self-regulation', and acts over and above the influence of demographic and socio-economic factors alone.

English as an Additional Language (EAL). EAL was not a significant predictor of 'self regulation' for this sample at the age of 14 (only a tiny group of 11 students in the sample receive EAL support).

Multiple Disadvantage Index of Risk. Additional contextualized models explored the impact of other background factors, such as family earned income, and the Multiple Disadvantage Index of Risk developed as part of the Early Years Transition and Special Education Needs (EYTSEN) Project (see Sammons et al., 2002b). This index records the occurrence of certain risk factors, such as pre-maturity/low birth weight, large family size, EAL, lone parenthood, low socio-economic status, absence of maternal educational qualifications, absence of a father figure, mother aged under 18 years at the time of birth of the EPPSE child, mother unemployed or not working etc.

Assuming identical demographic circumstances and similar behavioural history in early childhood, exposure to risk factors such as low maternal educational qualifications, pre-maturity or low weight at birth, adolescent mother (at EPPSE child's birth), large family size, single parent, or low family socio-economic status etc., is significantly and negatively associated with lower levels of 'self-regulation' at the end of KS3. Even the presence of one single risk factor appears to be sufficient for a student to be negatively differentiated from a similar student without exposure to any risk factors. The differences in 'self-regulation' with respect to students who have been protected from such risks become progressively larger as the number of risk factors increase, from 2.4 points lower (ES= -0.18) for one risk factor, to more than 9 points lower (ES= -0.65) for five or more risk factors (original data).

The difference between a student with no exposure to socio-economic and demographic risks, and a student with five or more such risk factors, is equivalent to 60 per cent of a standard deviation, which could potentially separate an average student from a student positioned in the upper 35 per cent in terms of 'self-regulation'. On the imputed data, exposure to additional risk factors is associated with even steeper increases in differentials among 'self-regulation', amounting to an average of 10.3

points (ES= -0.75) between extreme categories (potentially up to 12.7 at a 95% confidence interval), i.e., the difference in 'self-regulation' scores between an average and a top 25%-30% student.

Family Earned Income. All other things being equal, students from families with high annual earned incomes (between £67,000 and £132,000 per annum or higher) are on average rated 9.7 points higher in terms of 'self-regulation' compared to students from families with no earned income on the original data (equating 65% of a standard deviation), and 10.9 points higher, respectively, on the imputed data (or 73% of a standard deviation), which roughly amounts to the difference between an average student and a student in the top 30 per cent of the sample population in terms of 'self-regulation'.

With the exception of students from families in the lowest income bracket (between £2,500 and £15,000 annually), students from families in all categories of annual earned income are significantly and incrementally differentiated from students living in households without income earners. Effect sizes progressively increase from 0.25 to 0.72 on the original data, and from 0.32 to 0.80 on the imputed data, respectively. Income disparities continue to draw clear divisions among students' levels of 'self-regulation' at the end of Key Stage 3.

Section 3.1.2: The impact of individual and family factors on pro-social behaviour

Gender. Girls tend to be rated as more pro-social compared to boys. These gender differentials exceed 1/2 of a standard deviation from the sample mean on both the original and the imputed data (ES=0.58, ES=0.64), and appear to be stronger than for 'self-regulation' on both sets of estimates. These results are in accord with previous findings at earlier ages (Sammons et. al. 2007b; 2008b).

Age within cohort. A students' age within cohort only attains statistical significance on the imputed data, and at a low probability level ($p<.10$). The estimate indicates that for each additional month of age students' 'pro-social' scores are 0.2 points higher (ES= 0.08) in teachers' ratings (the predicted difference between the youngest and the oldest student within each cohort is therefore 2.4 points, or just 16% of a standard deviation from the sample average). The statistical significance of the estimate is however relatively volatile, suggesting that age is not consistently related to students' 'pro-social' behaviour.

Birth weight. There were no systematic associations between a student's weight at birth and their 'pro-social' behaviour at age 14 (teacher rating).

Ethnicity. There were no ethnic group tendencies identified, even though the coefficients associated with certain ethnic groups occasionally attain statistical significance. The significance of these estimates emerges at a low probability level (10%), is highly unstable, and only apparent on the non-imputed data.

Student's behavioural history. Early behavioural problems (parental report) predict 'pro-social' behaviour at KS3 when other background factors have been taken into account. The effect was smaller compared to 'self-regulation'.

Family size. The number of siblings was not related to students' 'pro-social' dispositions in Year 9.

Family Highest SES. The original and the imputed data appear to be slightly at variance with regard to family SES. While the magnitude of the coefficients and the direction of influence are broadly similar, the differences in predicted 'pro-social' behaviour between the different SES categories generally fail to reach statistical significance on the non-imputed data (with the minor exception of the skilled non-manual category, which seems to be significantly differentiated from the unemployed category).

TABLE 3.1.2.1: Contexualised Model 1: Pro-social behaviour

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 1								
FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA(Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	7.305	***	0.828	0.56	8.694	***	0.577	0.64
Age within cohort	0.110		0.131	0.05	0.170	*	0.087	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-0.114		2.499	-0.01	-0.150		1.479	-0.01
Black Caribbean heritage	-4.376		2.965	-0.33	-1.580		1.549	-0.12
Black African heritage	-0.233		3.654	-0.02	-2.299		1.980	-0.17
Any other ethnic minority	-0.123		3.385	-0.01	-0.819		1.715	-0.06
Indian heritage	1.481		3.413	0.11	1.729		1.919	0.13
Pakistani heritage	-3.450		2.550	-0.26	-1.284		1.365	-0.09
Bangladeshi heritage	4.219		4.860	0.32	3.224		2.685	0.24
Mixed race	-1.683		1.837	-0.13	-1.680		1.214	-0.12
Birth weight: Ref = Normal (> 2500g0								
Foetal infant/very low weight (<=91500g)	7.395	*	3.974	0.56	-0.391		2.501	-0.03
Low birth weight (1501-250 g)	0.090		1.720	0.01	-0.063		1.070	-0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.354		1.274	0.10	1.358		0.888	0.10
2 Siblings	0.390		1.408	0.03	0.283		0.964	0.02
3+ Siblings	-0.160		1.646	-0.01	-0.585		1.113	-0.04
Behavioural History: Ref = No Problems								
1 Behavioural Problem	-3.057	**	1.369	-0.23	-3.791	***	0.899	-0.28
2+ Behavioural Problems	-4.451		2.730	-0.34	-2.796		1.923	-0.21
Highest SES (KS2): Ref = Unemployed/Not working								
Unskilled	-2.900		3.126	-0.22	-1.092		2.210	-0.08
Semi-Skilled	-2.873		1.938	-0.22	-1.205		1.149	-0.09
Skilled Manual	-0.884		1.752	-0.07	0.995		1.053	0.07
Skilled, Non-Manual	2.878	*	1.660	0.22	2.899	***	0.993	0.21
Other Professional, Non-Manual	1.701		1.529	0.13	3.258	***	0.999	0.24
Professional, Non-Manual	3.182		1.935	0.24	4.460	***	1.350	0.33
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	0.613		3.247	0.05	1.389		2.314	0.10
Vocational	-1.500		1.557	-0.11	0.655		0.940	0.05
16 academic	1.759		1.338	0.13	2.495	***	0.778	0.18
18 academic	3.500	*	1.814	0.27	3.873	***	1.153	0.29
Degree or equivalent	5.497	***	1.698	0.42	5.823	***	1.087	0.43
Higher degree	6.579	***	2.298	0.50	5.788	***	1.670	0.43
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-1.805		1.334	-0.14	-1.384		0.920	-0.10
Separated/Divorced	-1.141		1.859	-0.09	-1.426		1.246	-0.11
Living with partner	-1.318		1.316	-0.10	-1.776	**	0.879	-0.13
Widow/ widower	2.246		4.456	0.17	0.509		2.701	0.04
Intercept	94.554	***	2.051		91.945	***	1.355	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.021	***	2.693		7.841	***	1.225	
Variance (Level 1)	173.076	***	4.120		184.052	***	2.645	
Total Variance	186.097				191.892			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9104.47				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.070				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.81				12.38			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	26.10				49.56			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.53				14.94			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.1.2.2: Contexualised Model 2: Pro-social behaviour

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.471	***	0.844	0.50	8.134	***	0.581	0.61
Age within cohort	0.126		0.132	0.06	0.136		0.086	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	0.033		2.508	0.00	0.147		1.446	0.01
Black Caribbean heritage	-3.179		3.011	-0.25	-0.941		1.524	-0.07
Black African heritage	1.787		3.665	0.14	-1.993		1.906	-0.15
Any other ethnic minority	-1.585		3.429	-0.12	-0.969		1.706	-0.07
Indian heritage	0.902		3.512	0.07	1.624		1.912	0.12
Pakistani heritage	-4.310		2.649	-0.34	-1.263		1.338	-0.10
Bangladeshi heritage	3.812		4.718	0.30	2.919		2.640	0.22
Mixed race	-1.322		1.869	-0.10	-1.411		1.208	-0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	4.742		4.255	0.37	0.548		2.556	0.04
Low birth weight, i.e. 1501-2500 g	0.996		1.734	0.08	0.305		1.040	0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	0.114		1.290	0.01	1.109		0.885	0.08
2 Siblings	-0.543		1.428	-0.04	0.247		0.972	0.02
3+ Siblings	-0.841		1.664	-0.07	-0.193		1.045	-0.01
SEN Status in Year 9: Ref = No SEN								
School Action	-8.863	***	1.653	-0.69	-6.221	***	0.973	-0.47
School Action +	-13.211	***	2.075	-1.03	-10.501	***	1.487	-0.79
Full Statement	-8.530	***	2.650	-0.67	-8.607	***	1.393	-0.65
Free School Meals (FSM) Eligibility	-0.709		1.360	-0.06	-1.790	**	0.800	-0.13
Student's Receipt of EAL Support	-6.366		6.857	-0.50	-4.219		3.452	-0.32
Mother's Highest Qualifications (pre-school) Level: Ref = None								
Other professional/ Misc.	0.774		3.302	0.06	1.261		2.319	0.09
Vocational	-2.094		1.559	-0.16	0.667		0.946	0.05
16 academic	1.215		1.347	0.09	2.149	***	0.739	0.16
18 academic	3.363	*	1.815	0.26	4.062	***	1.094	0.31
Degree or equivalent	5.175	***	1.612	0.40	5.906	***	0.976	0.44
Higher degree	7.678	***	2.154	0.60	6.556	***	1.519	0.49
Marital Status of Parent Ref = Married								
Single	-2.076		1.289	-0.16	-1.842	**	0.829	-0.14
Separated/Divorced	0.032		1.850	0.00	-1.510		1.221	-0.11
Living with partner	-0.632		1.337	-0.05	-1.580	*	0.829	-0.12
Widow/ widower	2.810		4.289	0.22	0.155		2.717	0.01
Intercept	98.468	***	1.806		95.881	***	1.092	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.771	***	2.503		6.869	***	1.119	
Variance (Level 1)	164.490	***	4.055		176.597	***	2.507	
Total Variance	175.261				183.466			
Number of Level-1 Observations	1059				2930			
Number of Level-2 Units	347				775			
Deviance (-2 x Log Restricted-Likelihood)	8342.49				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061				0.037			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	20.93				15.93			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	38.87				55.81			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	22.33				18.68			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Significant differentials were evident between students of unemployed parents, and students of parents in work (imputed data). These differentials follow an ascending pattern, increasing proportionally with occupational status, from 2.9 points higher for students of parents in skilled non-manual occupations (ES= 0.21), to 4.5 points (less than 1/3 of a standard deviation) for students of parents in professional non-manual employment (ES=0.33). These SES differentials should be regarded as rather conservative, as they are estimated assuming equal levels of maternal academic qualifications (in addition to equal levels of other demographic and socio-economic factors). When this assumption is relaxed, the SES differentials appear much larger. This shows that mothers' education accounts for quite a proportion of the apparent SES difference.

Parents' highest qualifications Level. Both parents' educational attainment levels seemed to be significantly associated with students' 'pro-social behaviour' in Year 9, albeit to a lesser extent compared to 'self-regulation'.

On mother's highest qualification levels both sets of estimates are largely in agreement. The difference between students of mothers with 18 year academic qualifications and students of mothers with no qualifications is ES=0.27 (original data); ES=0.29 (imputed). The same applies to the difference in scores between students of mothers holding a degree or equivalent, and students of mothers with no formal educational qualifications, ES=0.42 (original data); ES=0.43 (imputed). The two sets of estimates diverge slightly in the differentials between students of mothers holding a higher degree, compared to students of mothers with no educational attainments, with the non-imputed data suggesting larger such differentials, amounting to 6.6 points (ES=0.50), or 44 per cent of a standard deviation. While this difference is still insufficient to place an otherwise average student in the top quartile in terms of 'pro-social' behaviour score, it should be noted that the estimates are produced assuming equal SES status, and a substantial overlap between SES and parental educational qualifications can be presumed.

Parents marital status. Students from lone parent and cohabitating families tend to be rated slightly lower according to the estimates on the imputed data. While these tendencies emerge quite consistently on the imputed data, they nevertheless fail to be confirmed on the original data.

SEN status. Teachers tended to rate SEN students slightly less favourably for 'pro-social' behaviour, ranging from 8.5 points lower (or 57% of a standard deviation) in the case of School Action students, to nearly one standard deviation lower (13.2 points, ES=1.03) in the case of students who require transfer to School Action Plus.

FSM eligibility. A certain tendency of teachers to assign slightly lower 'pro-social' behaviour scores could be noted on the imputed data, although the magnitude of the expected differentials between FSM eligible and non-eligible students is does not exceed 1.8 points (ES=0.13). This tendency is not statistically significant on the non-imputed data.

English as an Additional Language (EAL). Similar to 'self-regulation', receipt of EAL support did not appear to differentiate students' 'pro-social' behaviour scores in our sample.

Family earned income. There was no clear differential gradient (progressive increase) associated with different ranges of family earned income, unlike 'self-regulation'. While all income categories are differentiated from non-earner households, students with higher annual earned income appear to be attributed significantly higher levels of peer empathy compared to those from families with no earned income in teachers' ratings (ES=0.55 original data; ES=0.58 imputed data), and clearly higher than those with lower family income levels.

Multiple Disadvantage Index of Risk. Although all categories of at-risk students are significantly differentiated (at high probability levels) from students without risk exposure, low risk levels (consisting of one or two risk factors) do not seem to produce very large differences in teachers' ratings of 'pro-social' behaviour. As the level of risk increases to moderate and high, the predicted score differences appear to increase reaching 8.3 points, i.e. 55 per cent of a standard deviation, in the presence of 5 or more risk factors.

Section 3.1.3: The impact of individual and family factors on hyperactivity

TABLE 3.1.3.1: Contexualised Model 1: Hyperactivity

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-7.026	***	0.811	-0.54	-7.729	***	0.521	-0.57
Age within cohort	-0.075		0.129	-0.04	-0.167	**	0.084	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-1.475		2.461	-0.11	-0.065		1.514	-0.00
Black Caribbean heritage	2.075		2.901	0.16	0.648		1.495	0.05
Black African heritage	3.291		3.574	0.25	2.691		1.952	0.20
Any other ethnic minority	-0.037		3.324	-0.00	0.277		1.789	0.02
Indian heritage	-5.229		3.342	-0.40	-3.847	*	2.001	-0.28
Pakistani heritage	2.162		2.488	0.17	-0.368		1.309	-0.03
Bangladeshi heritage	-8.221	*	4.784	-0.63	-5.711	**	2.704	-0.42
Mixed race	0.899		1.806	0.07	1.725		1.189	0.13
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<=1500g)	-5.352		3.915	-0.41	1.913		2.270	0.14
Low birth weight (1501-2500g)	1.591		1.696	0.12	0.953		1.128	0.07
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.972		1.254	-0.07	-1.846	**	0.888	-0.14
2 Siblings	-0.656		1.386	-0.05	-1.158		0.943	-0.09
3+ Siblings	1.624		1.619	0.12	0.592		1.097	0.04
Child's Behaviour History: Re No Probs								
1 Behavioural problem	3.557	***	1.349	0.27	4.851	***	0.897	0.36
2+ Behavioural problems	8.703	***	2.687	0.67	5.919	***	1.958	0.44
Highest Family SES (KS2) Ref = Unemployed/Not working								
Unskilled	1.851		3.082	0.14	1.989		2.189	0.15
Semi-Skilled	4.378	**	1.907	0.33	2.291	**	1.112	0.17
Skilled Manual	2.192		1.723	0.17	-0.437		1.050	-0.03
Skilled, Non-Manual	-1.749		1.633	-0.13	-2.837	***	1.002	-0.21
Other Professional, Non-Manual	-0.642		1.503	-0.05	-3.447	***	0.950	-0.25
Professional, Non-Manual	-0.944		1.904	-0.07	-4.067	***	1.281	-0.30
Mother's Highest Qualifications (pre-school) Ref = None								
Other professional/ Misc.	0.700		3.197	0.05	-2.789		2.246	-0.21
Vocational	0.641		1.530	0.05	-1.671	*	0.936	-0.12
16 academic	-1.296		1.316	-0.10	-2.464	***	0.777	-0.18
18 academic	-3.111	*	1.782	-0.24	-4.399	***	1.143	-0.33
Degree or equivalent	-5.154	***	1.665	-0.39	-6.429	***	1.112	-0.48
Higher degree	-6.582	***	2.252	-0.50	-6.943	***	1.616	-0.51
Marital Status of Parent: Ref = Married								
Single	4.713	***	1.312	0.36	2.843	***	0.909	0.21
Separated/Divorced	2.397		1.834	0.18	2.799	**	1.244	0.21
Living with partner	2.262	*	1.297	0.17	2.774	***	1.051	0.21
Widow/ widower	4.062		4.380	0.31	-0.572		2.776	-0.04
Intercept	102.716	***	2.013		107.642	***	1.267	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.352	***	2.071		5.421	***	1.083	
Variance (Level 1)	171.173	***	3.972		182.787	***	2.569	
Total Variance	178.525				188.208			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9066.72				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.041				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.01				13.57			
Proportion of Level-2 Variance Reduction [Compared to Null Model(%)	55.19				60.98			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.72				16.50			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Gender. There were relatively large differential scores for gender, even when allowing for the impact of socio-economic, demographic, and early childhood behavioural history measures, amounting to nearly 1/2 of a standard deviation (ES=0.54 original; ES=0.57 imputed). These differences are somewhat attenuated when SEN status is accounted for, but still significant at high probability levels ($p<.001$).

Age within year group. Younger students tend to be rated with higher levels of hyperactivity. While this tendency is relatively consistent on the imputed data, it does not reach statistical significance on the original data.

Birth weight. The developmental psychology literature suggests links between low birth weight and 'hyperactivity' (and general behavioural problems) however the EPPSE data found no evidence of a systematic association between students' weight at birth, and the levels of hyperactivity scores the end of KS3. This may be because the models controlled for the influence early behavioural problems (as identified by parents).

Ethnicity. The only ethnic group that seemed to be systematically rated as less 'hyperactive' was those of Bangladeshi heritage, although the small sample size for this group means the result must be interpreted with caution.

Student's behavioural history. Students whose parents reported behavioural problems in early childhood tend to be rated as more 'hyperactive' in Year 9. Although negativity in teachers' ratings seems to be commensurate with the number of behavioural problems recorded in parental interviews according to both sets of estimates, students having one behavioural problem appear to be more clearly differentiated from those having two or more behavioural problems on the original data (ES=0.67) compared to the imputed data (ES=0.44).

Family size. Singletons tended to be consistently rated as being more 'hyperactive' compared to students with one sibling. The size of the differential is rather low (1.8 points, ES= -0.12), but this pattern appears to be quite robust across model specifications, and statistically significant at a 90% or a 95% confidence level.

Family highest SES. Unlike 'self-regulation' and 'pro-social behaviour', the estimates based on the original data do not support the notion of an equity gap for 'hyperactivity' at KS3. This finding is quite surprising. Although not indicating a perfectly linear pattern of association, the estimates obtained on the imputed data do seem to confirm the persistence of differentials among students from various SES groups in teachers' rating of 'hyperactivity' the end of KS3, with students from families of higher SES displaying increasingly lower levels of 'hyperactivity'.

Parents' highest qualifications level. Taking into account background characteristics, including family highest SES, mother's educational qualifications are still associated with additional differentials in teachers' ratings of 'hyperactivity'. This trend is particularly evident on the imputed data, where even students of mothers with vocational and 16 year academic qualifications appear to be rated as less 'hyperactive' compared to students of mothers with no educational qualifications.

Students of mothers holding a higher degree are rated up to 7 points lower in 'hyperactivity' (compared to mothers with no educational qualifications), amounting to nearly 50 per cent of a standard deviation (ES= -0.51 imputed).

Parent marital status. The size of the significance related to marital status differs for original and imputed data. On the original data there appear to be large differentials between students of single parents and students living with married parents/carers (ES=0.36), indicating that students with lone parents are rated as considerably more 'hyperactive'. A smaller difference, significant at a lower probability level, can be observed between the lone parents and students living with cohabitating parents (ES=0.17). Conversely, on the imputed data, approximately equal differences are found between students living with both parents on the one hand and students from families with cohabitating parents, single parent, and separated or divorced parents, on the other hand (ES=0.21).

TABLE 3.1.3.2: Contexualised Model 2: Hyperactivity

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.010	***	0.793	-0.50	-6.963	***	0.516	-0.54
Age within cohort	-0.104		0.124	-0.05	-0.130	*	0.079	-0.06
Ethnicity: Ref = White UK heritage								
White European heritage	-1.414		2.363	-0.12	-0.671		1.438	-0.05
Black Caribbean heritage	1.310		2.827	0.11	-0.255		1.457	-0.02
Black African heritage	1.167		3.444	0.10	2.110		1.892	0.16
Any other ethnic minority	0.316		3.226	0.03	0.261		1.731	0.02
Indian heritage	-4.366		3.298	-0.36	-3.596	*	1.858	-0.28
Pakistani heritage	1.656		2.488	0.14	-0.420		1.293	-0.03
Bangladeshi heritage	-8.394	*	4.444	-0.69	-5.507	**	2.585	-0.43
Mixed race	0.392		1.758	0.03	1.359		1.149	0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (1500g)	-2.038		4.009	-0.17	0.967		2.414	0.07
Low birth weight (1501-2500g)	0.619		1.635	0.05	0.343		1.125	0.03
Number of Siblings: Ref = No Siblings								
1 Sibling	0.397		1.214	0.03	-1.545	*	0.836	-0.12
2 Siblings	0.304		1.345	0.03	-1.168		0.892	-0.09
3+ Siblings	1.569		1.567	0.13	-0.127		1.022	-0.01
SEN Status in Year 9: Ref = No SEN								
School Action	11.924	***	1.557	0.98	9.114	***	1.008	0.71
School Action +	19.636	***	1.955	1.62	14.860	***	1.255	1.15
Full Statement	12.582	***	2.494	1.04	11.287	***	1.401	0.87
Student's Free School Meals (FSM) Eligibility	3.384	***	1.280	0.28	2.912	***	0.794	0.23
Student's Receipt of EAL Support	2.905		6.458	0.24	0.308		3.203	0.02
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	2.530		3.110	0.21	-2.124		2.246	-0.16
Vocational	1.985		1.467	0.16	-1.339		0.950	-0.10
16 academic	0.081		1.269	0.01	-1.700	**	0.843	-0.13
18 academic	-2.308		1.708	-0.19	-4.185	***	1.137	-0.32
Degree or equivalent	-2.839	*	1.515	-0.23	-5.807	***	1.076	-0.45
Higher degree	-6.389	***	2.024	-0.53	-7.064	***	1.490	-0.55
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	4.006	***	1.214	0.33	2.990	***	0.792	0.23
Separated/Divorced	0.199		1.743	0.02	2.545	**	1.176	0.20
Living with partner	1.291		1.259	0.11	2.362	**	0.934	0.18
Widow/ widower	1.360		4.037	0.11	-0.607		2.759	-0.05
Intercept	98.489	***	1.697		102.953	***	1.037	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.467	***	1.897		4.416	***	0.960	
Variance (Level 1)	147.301	***	3.556		166.700	***	2.354	
Total Variance	154.767				171.116			
Number of Level-1 Observations	1059				2930			
Number of Level-2 Units	347				775			
Deviance (-2 x Log Restricted-Likelihood)	8218.17				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.048				0.026			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.45				21.18			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	54.49				68.22			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	31.27				24.08			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Special Education Needs (SEN) Status. Students identified as SEN had substantially higher 'hyperactivity' scores at the end of Key Stage 3. Those with a School Action Plus intervention, are rated more than one standard deviation (19 points) higher in 'hyperactivity' (compared to students who are not on the SEN register), ES= 1.62 (original). As the magnitude of the effect indicates, even with highly favourable socio-economic circumstances, these students had above average rating of 'hyperactivity'. Their proneness to careless mistakes, lack of concentration, constant movement etc., and a consequential knock on effect with their academic performance, may be some of the reasons for a School Action Plus intervention.

Free School Meals (FSM) eligibility. Taking into account background characteristics, students eligible for FSM were given higher scores on 'hyperactivity' by 3.4 points (ES= 0.28 original data).

English as an Additional Language (EAL). There were no statistically significant differences between the 'hyperactivity' scores of students who were receiving EAL support in Year 9, and those who were not.

Section 3.1.4: The impact of individual and family factors on anti-social behaviour

TABLE 3.1.4.1: Contexualised Model 1: Anti-social behaviour

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.806	***	0.805	-0.37	-6.066	***	0.627	-0.44
Age within cohort	0.024		0.128	0.01	-0.061		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-1.616		2.447	-0.12	-0.162		1.575	-0.01
Black Caribbean heritage	1.935		2.879	0.15	0.968		1.569	0.07
Black African heritage	2.518		3.544	0.19	2.745		2.284	0.20
Any other ethnic minority	2.480		3.302	0.19	1.253		2.056	0.09
Indian heritage	-3.988		3.316	-0.31	-1.772		2.073	-0.13
Pakistani heritage	0.107		2.466	0.01	-0.700		1.443	-0.05
Bangladeshi heritage	-6.152		4.757	-0.47	-4.224		2.844	-0.30
Mixed race	1.575		1.794	0.12	1.815		1.429	0.13
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<=1500g)	-4.772		3.894	-0.37	2.121		2.441	0.15
Low birth weight (1501-2500g)	2.555		1.687	0.20	1.517		1.221	0.11
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.272		1.246	-0.10	-1.528	*	0.917	-0.11
2 Siblings	-0.501		1.377	-0.04	-0.702		1.016	-0.05
3+ Siblings	2.026		1.609	0.16	0.918		1.243	0.07
Behavioural History: Ref = No Beh Probs								
1 Behavioural problem	2.899	**	1.342	0.22	4.466	***	0.987	0.32
2+ Behavioural problems	5.357	**	2.672	0.41	4.558	**	2.059	0.33
Highest family SES (KS2): Ref = Unemployed/Not working								
Unskilled	1.800		3.066	0.14	2.999		2.282	0.22
Semi-Skilled	3.456	*	1.896	0.26	1.312		1.213	0.09
Skilled Manual	2.170		1.712	0.17	-0.993		1.165	-0.07
Skilled, Non-Manual	-1.012		1.624	-0.08	-2.892	***	1.054	-0.21
Other Professional, Non-Manual	0.599		1.494	0.05	-2.776	***	0.996	-0.20
Professional, Non-Manual	-0.344		1.892	-0.03	-3.670	***	1.354	-0.26
Mother's Highest Qual (Ea Yrs):Ref =None								
Other professional/Misc.	2.503		3.179	0.19	-0.263		2.388	-0.02
Vocational	0.868		1.520	0.07	-0.630		0.987	-0.05
16 academic	-1.570		1.308	-0.12	-2.142	**	0.864	-0.15
18 academic	-2.864		1.770	-0.22	-3.522	***	1.281	-0.25
Degree or equivalent	-5.206	***	1.653	-0.40	-5.797	***	1.166	-0.42
Higher degree	-5.398	**	2.235	-0.41	-5.748	***	1.683	-0.41
Marital Status of Parent Ref = Married								
Single	3.807	***	1.304	0.29	2.156	**	0.997	0.15
Separated/Divorced	3.217	*	1.824	0.25	2.476	*	1.278	0.18
Living with partner	1.016		1.290	0.08	1.945	*	1.121	0.14
Widow/ widower	2.376		4.352	0.18	-2.062		2.966	-0.15
Intercept	101.332	***	1.999		106.140	***	1.268	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.465	**	2.030		6.154	***	1.306	
Variance (Level 1)	170.539	***	3.978		194.062	***	2.872	
Total Variance	176.004				200.216			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9053.16				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.031				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	19.40				9.07			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	60.23				48.48			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	21.89				11.16			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.1.4.2: Contexualised Model 2: Anti-social behaviour

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-3.844	***	0.797	-0.31	-5.388	***	0.604	-0.40
Age within cohort	0.023		0.125	0.01	-0.025		0.086	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-1.389		2.380	-0.11	-0.654		1.514	-0.05
Black Caribbean heritage	1.524		2.835	0.12	0.070		1.560	0.01
Black African heritage	0.141		3.458	0.01	2.069		2.186	0.15
Any other ethnic minority	1.913		3.242	0.16	1.157		2.043	0.09
Indian heritage	-3.647		3.308	-0.30	-1.605		1.960	-0.12
Pakistani heritage	0.163		2.496	0.01	-0.893		1.413	-0.07
Bangladeshi heritage	-6.319		4.475	-0.51	-4.260		2.823	-0.32
Mixed race	0.687		1.768	0.06	1.406		1.435	0.10
Birth weight: Ref = Normal (>2500g)								
Foetal infant/very low weight (<1500g)	-3.216		4.037	-0.26	1.274		2.614	0.09
Low birth weight (1501-2500g)	1.015		1.648	0.08	0.997		1.163	0.07
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.001		1.222	-0.00	-1.286		0.867	-0.10
2 Siblings	0.529		1.354	0.04	-0.766		0.973	-0.06
3+ Siblings	1.931		1.578	0.16	0.205		1.163	0.02
SEN Status in Year 9: Ref = No SEN								
School Action	7.473	***	1.568	0.61	6.323	***	1.042	0.47
School Action +	17.386	***	1.969	1.41	13.685	***	1.447	1.02
Full Statement	11.627	***	2.508	0.95	10.758	***	1.438	0.80
Student's Free School Meals (FSM) Eligibility	4.281	***	1.287	0.35	3.105	***	0.859	0.23
Student's Receipt of EAL Support	8.309		6.501	0.68	-0.146		3.557	-0.01
Mother's Highest Qualification (Early Yrs) Ref = None								
Other professional/ Misc.	3.954		3.132	0.32	0.598		2.348	0.04
Vocational	2.541	*	1.477	0.21	-0.199		1.005	-0.01
16 academic	-0.235		1.278	-0.02	-1.352	*	0.818	-0.10
18 academic	-1.859		1.717	-0.15	-3.035	**	1.199	-0.23
Degree or equivalent	-2.530	*	1.521	-0.21	-4.863	***	1.070	-0.36
Higher degree	-3.993	**	2.031	-0.32	-5.475	***	1.508	-0.41
Marital Status of Parent Ref = Married								
Single	3.131	**	1.222	0.25	2.205	**	0.949	0.16
Separated/Divorced	1.444		1.756	0.12	2.116	*	1.264	0.16
Living with partner	0.455		1.268	0.04	1.519		1.021	0.11
Widow/ widower	-1.033		4.061	-0.08	-2.107		2.904	-0.16
Intercept	97.804	***	1.704		101.800	***	1.081	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.039	**	1.719		4.778	***	1.121	
Variance (Level 1)	151.148	***	3.618		181.427	***	2.699	
Total Variance	156.186				186.205			
Number of Level-1 Observations	1059				2930			
Number of Level-2 Units	347				775			
Deviance (-2 x Log Restricted-Likelihood)	8231.01				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.032				0.026			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	28.57				14.99			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	63.33				60.00			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	30.69				17.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

There were significant statistical effects found for a number of factors associated with 'anti-social' behaviour in Year 9. In general, these finding are very much in line with those identified at earlier time points. The statistically significant factors are described below:

Gender: In line with earlier findings, girls show significantly lower scores for 'anti-social' behaviour (ES=0.31 original, ES=-0.40 imputed). These effects are moderately strong and highly significant.

Student's behavioural history: Students who had an earlier record of behavioural problems (in the early years) still showed poorer outcomes in Year 9. The effects were moderately strong, particularly for the group who had 2 or more behaviour problems, compared to those who had none (ES=0.44 original, ES=0.36 imputed).

Family highest SES: Students from professional non-manual backgrounds show significantly better outcomes on 'anti-social' behaviour compared with the unemployed group. Results were stronger on the imputed than the original data (ES=0.26 original, ES=0.48 imputed). For the imputed data significant (smaller but significant) differences for other family SES groups (compared to the unemployed category) were found.

Parents' highest qualifications level: There were very strong effects that showed a linear relationship for both mother and father's highest qualification predicting better outcomes (i.e. lower 'anti-social' behaviour scores). For example for mother having a degree versus no qualifications (ES=0.47 original, ES=0.57 imputed). The effects were very similar for father's qualifications at this age. There were also smaller benefits associated with parental academic qualifications at age 16 and 18, in reducing scores on 'anti-social' behaviour.

Parents marital status: More modest effects were found for marital status with reduced 'anti-social' behaviour scores apparent for students whose parents were married during the student's pre-school years (comparison group is single parents/never married). These effects were somewhat stronger on the original (ES=0.27) than the imputed (ES=0.16) data.

Free school meals (FSM) eligibility: Students from low family incomes, eligible for FSM showed poorer outcomes for this factor (ES=0.35 original, 0.23 imputed).

Family annual earned income: In general higher levels of family income predict reduced scores for 'anti-social' behaviour. The largest difference were found between the highest and lowest income groups (ES=0.42 original, 0.53 imputed).

SEN status: Those students with any record of SEN show significantly poorer outcomes for 'anti-social' behaviour. The effects are largest for those on School Action Plus versus those not on the SEN register (ES=1.41 original, ES=1.02 imputed). Similar patterns were found for students who had a full statement compared with those not on the register (ES=0.95 original, ES=0.80 imputed).

It should be noted that there were no statistically significant effects found for the following factors Age within year group, Birth weight, Ethnicity, Family size and English as an Additional Language (EAL) support.

TABLE 3.1: Summary of background influences on social behaviours in Year 9

Factors	Self-regulation	Pro-social	Hyperactivity	Anti-social
Student Factors				
Gender (boys)	0.45	0.61	-0.54	-0.42
Age (continuous)	0.12	0.08	-0.08	ns
Birth weight (normal)				
Foetal infant/very low weight	ns	ns	ns	ns
Low birth weight	ns	ns	ns	ns
Number of siblings (none)				
1 sibling	0.13	0.11	-0.15	-0.12
2 siblings	ns	ns	ns	ns
3 siblings	ns	ns	ns	ns
Ethnicity (White UK heritage)				
White European heritage	ns	ns	ns	ns
Black Caribbean heritage	ns	ns	ns	ns
Black African heritage	ns	ns	ns	ns
Any other ethnic minority	ns	ns	ns	ns
Indian heritage	0.33	NS	-0.33	ns
Pakistani heritage	ns	ns	ns	ns
Bangladeshi heritage	0.37	ns	-0.48	-0.34
Mixed race	ns	ns	ns	ns
Early behavioural problems (none)				
1 Behavioural Problem	-0.30	-0.28	0.36	0.32
2+ Behavioural Problems	-0.34	ns	0.44	0.33
Family factors				
Parents' Highest SES at KS2 (unemployed/not working)				
Unskilled	ns	ns	ns	ns
Semi-skilled	ns	ns	0.17	ns
Skilled, Manual	ns	ns	ns	ns
Skilled, Non-Manual	0.30	0.20	-0.20	-0.20
Other Professional, Non-Manual	0.31	0.23	-0.24	-0.19
Professional, Non-Manual	0.45	0.31	-0.28	-0.25
Mother's Highest Qualification Level (none)				
Other Professional/Misc.	ns	ns	ns	ns
Vocational	ns	ns	ns	ns
16 academic	0.17	0.15	-0.15	-0.13
18 academic	0.31	0.22	-0.25	-0.21
Degree or equivalent	0.47	0.36	-0.40	-0.37
Higher degree	0.54	0.35	-0.43	-0.36
Marital Status of Parent/Guardian/Carer (married)				
Single	-0.13	ns	0.21	0.15
Separated/Divorced	NS	ns	0.21	0.18
Living with partner	-0.18	-0.13	0.21	0.14
Widow/Widower	ns	ns	ns	ns
Home Learning Environment				
Early Years Home Learning Environment Index (Grouped) (Very low)				
Low (Index values: 14-19)	0.15	0.13	ns	ns
Average (Index values: 20-24)	0.17	NS	ns	ns
High (Index values: 25-32)	0.32	0.27	-0.25	ns
Very high (Index values: 33-45)	0.48	0.30	-0.35	ns
Early years Home Learning Environment Index (Continuous scale)	N/A	N/A	N/A	-0.12*

Section 3.2: The influence of Home Learning Environment and Homework

This sub-section explores the impact of learning processes which take place out of school, including time spent on homework, on social-behavioural outcomes at age 14.

The home learning environment (HLE) record the occurrence and/or frequency of various activities within the EPPSE student's household at three time points (early years, KS1, and KS2) and their bearing on academic and behavioural outcomes

During the early years, these activities refer to parental activities such as monitoring e.g., enforcing a regular bedtime), instructive play (e.g., playing with letter and/or numbers), and the facilitation of interactions with other children (inviting friends at the EPPSE child's home or visiting friends). At later stages, the quality of HLE is measured by age-specific activities, such as use of computer for educational or recreational purposes, teaching a school subject, and library or educational visits. The detailed aspects as well as the methodology employed to construct these composite measures are described in Appendix 6.

As well as the HLE, EPPSE explore the amount of time students reported (via questionnaires) they spent on doing homework outside of school time.

Section 3.2.1: The influence of Home Learning Environment (HLE) and time spent on homework on 'self-regulation'

As Table 3.2.1.1 indicates that the quality of the early years HLE continues to be significantly associated with students' levels of 'self-regulation' to the end of KS3. Taking into account background characteristics, those students who had a very high early years HLE had better 'self-regulation' in Year 9 compared to those who had a very low early years HLE. The ES=0.47(original) and ES=0.48 (imputed) for very high HLE compared to very low HLE.

As the early years HLE scores increase, scores on 'self-regulation' also increase on both original and imputed data. However, these only reach statistical significance for high and very high early years HLE on the original data. It is significant for all levels of HLE on the imputed data. Overall, the results seem to indicate that high quality early years HLE promotes 'self-regulation'.

The results of the KS1 HLE analyses are not reported as there were no statistical significant effects. The results for the KS2 HLE are less conclusive (see Table 3.2.1.2). Whereas the estimate capturing the impact of the global KS2 HLE index does attain statistical significance (on the imputed data only) in the absence of statistical control for early years HLE, showing a modest effect (ES=0.11), the statistical significance of the estimate withers away as soon as this statistical control is added (results not reported for reasons of space). This suggests that the early years HLE is the primary driver of 'self-regulation' in the long term.

TABLE 3.2.1.1: Contextualised Model: Influence of early years HLE on self-regulation in Yr9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Early Years HLE (Categorical) Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	5.275	***	0.841	0.40	6.089	***	0.573	0.45
Age within cohort	0.168		0.131	0.08	0.251	***	0.082	0.12
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	5.588		3.926	0.43	-1.625		2.340	-0.12
Low birth weight (1501-2500g)	-1.881		1.712	-0.14	-0.819		1.094	-0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	1.840		1.269	0.14	1.751	*	0.916	0.13
2 Siblings	1.022		1.414	0.08	0.993		0.991	0.07
3+ Siblings	0.540		1.658	0.04	-0.089		1.191	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	1.941		2.510	0.15	0.268		1.521	0.02
Black Caribbean heritage	-1.920		2.931	-0.15	-0.025		1.528	-0.00
Black African heritage	-1.366		3.608	-0.10	-1.859		1.960	-0.14
Any other ethnic minority	2.261		3.364	0.17	0.853		1.825	0.06
Indian heritage	5.188		3.575	0.40	4.444	**	1.918	0.33
Pakistani heritage	-1.383		2.594	-0.11	0.655		1.330	0.05
Bangladeshi heritage	6.540		4.802	0.50	4.961	*	2.689	0.37
Mixed race	-0.828		1.817	-0.06	-1.445		1.160	-0.11
Behavioural History: Ref = No Beh Probs								
1 Behavioural problem	-2.942	**	1.361	-0.23	-4.081	***	0.908	-0.30
2+ Behavioural problems	-7.420	***	2.746	-0.57	-4.532	**	1.980	-0.34
Highest SES (KS2) Ref = Un Emyed/Not wk								
Unskilled	-0.437		3.160	-0.03	-0.156		2.141	-0.01
Semi-Skilled	-2.070		1.923	-0.16	-1.128		1.200	-0.08
Skilled Manual	-0.546		1.754	-0.04	0.780		1.058	0.06
Skilled, Non-Manual	4.372	***	1.658	0.34	4.052	***	0.967	0.30
Other Professional, Non-Manual	2.660	*	1.529	0.20	4.108	***	0.964	0.31
Professional, Non-Manual	4.394	**	1.935	0.34	6.038	***	1.298	0.45
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	1.242		3.227	0.10	2.683		2.253	0.20
Vocational	-1.281		1.575	-0.10	1.252		0.952	0.09
16 academic	1.361		1.360	0.10	2.258	***	0.801	0.17
18 academic	4.155	**	1.855	0.32	4.122	***	1.205	0.31
Degree or equivalent	5.776	***	1.745	0.44	6.271	***	1.165	0.47
Higher degree	7.360	***	2.322	0.56	7.217	***	1.689	0.54
Marital Status of Parent: Ref = Married								
Single	-2.775	**	1.329	-0.21	-1.757	*	0.907	-0.13
Separated/Divorced	0.928		1.861	0.07	-1.024		1.252	-0.08
Living with partner	-1.818		1.310	-0.14	-2.467	***	0.893	-0.18
Widow/ widower	-0.913		4.396	-0.07	-0.233		2.721	-0.02
Early Years Home Learning Environment Index (Grouped): Ref = Very Low (0-13)								
Low (Index Values: 14-19)	1.675		1.777	0.13	2.053	**	1.033	0.15
Average (Index Values: 20-24)	2.008		1.817	0.15	2.262	**	1.021	0.17
High (Index Values: 25-32)	3.699	**	1.768	0.28	4.258	***	1.068	0.32
Very High (Index Values: 33-45)	6.101	***	1.983	0.47	6.476	***	1.268	0.48
Intercept	91.309	***	2.434		88.866	***	1.560	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.750	***	2.339		5.552	***	1.081	
Variance (Level 1)	169.947	***	4.036		180.491	***	2.575	
Total Variance	179.697				186.043			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8888.52				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.054				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.77				13.70			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	39.08				65.81			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.21				17.45			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.2.1.2: Contextualised Model: Influence of KS 2 HLE on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Key Stage 2 HLE Model 1								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
FIXED-EFFECTS PARAMETERS	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.577	***	0.860	0.50	7.156	***	0.667	0.53
Age within cohort	0.282	**	0.138	0.14	0.277	***	0.105	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	1.024		2.565	0.08	0.292		1.891	0.02
Black Caribbean heritage	-3.328		3.458	-0.25	-1.665		2.295	-0.12
Black African heritage	-3.330		3.717	-0.25	-2.586		2.675	-0.19
Any other ethnic minority	0.788		3.451	0.06	-1.545		2.612	-0.11
Indian heritage	3.764		3.457	0.29	2.496		2.405	0.19
Pakistani heritage	-3.163		2.748	-0.24	-0.584		2.006	-0.04
Bangladeshi heritage	5.961		4.825	0.45	3.108		3.130	0.23
Mixed race	-0.999		2.021	-0.08	-0.127		1.578	-0.01
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	5.575		4.117	0.42	1.463		3.118	0.11
Low birth weight (1501-2500g)	-1.971		1.855	-0.15	-2.116		1.455	-0.16
Number of Siblings: Ref = No Siblings								
1 Sibling	1.465		1.314	0.11	2.016	**	1.006	0.15
2 Siblings	0.616		1.461	0.05	0.955		1.112	0.07
3+ Siblings	0.087		1.714	0.01	0.240		1.291	0.02
Behavioural History: Ref = No Beh Problems								
1 Behavioural problem	-3.039	**	1.431	-0.23	-4.504	***	1.147	-0.33
2+ Behavioural problems	-8.137	***	2.823	-0.62	-6.671	***	2.351	-0.49
Highest SES (KS2): Ref = Unemployed/Not working								
Unskilled	-0.702		3.198	-0.05	-0.890		2.806	-0.07
Semi-Skilled	-1.133		2.055	-0.09	-0.731		1.549	-0.05
Skilled Manual	0.012		1.867	0.00	0.720		1.360	0.05
Skilled, Non-Manual	5.213	***	1.726	0.40	4.277	***	1.229	0.32
Other Professional, Non-Manual	3.298	**	1.604	0.25	3.720	***	1.197	0.28
Professional, Non-Manual	4.919	**	2.030	0.37	5.613	***	1.559	0.42
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	2.521		3.401	0.19	5.464	**	2.766	0.41
Vocational	-0.465		1.658	-0.04	1.609		1.230	0.12
16 academic	1.957		1.438	0.15	2.789	***	1.077	0.21
18 academic	5.825	***	1.878	0.44	5.650	***	1.454	0.42
Degree or equivalent	7.227	***	1.785	0.55	7.586	***	1.409	0.56
Higher degree	9.859	***	2.402	0.75	9.569	***	1.943	0.71
Marital Status of Parent Ref = Married								
Single	-2.148		1.396	-0.16	-2.243	**	1.043	-0.17
Separated/Divorced	0.581		1.912	0.04	-1.328		1.480	-0.10
Living with partner	-1.162		1.405	-0.09	-2.894	***	1.078	-0.21
Widow/ widower	-1.542		4.646	-0.12	-0.962		3.177	-0.07
Key Stage 2 HLE Global Index	0.931		0.955	0.07	1.534	**	0.723	0.11
Intercept	90.714	***	2.713		88.934	***	2.050	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	6.196	***	2.162		3.808	*	1.397	
Variance (Level 1)	173.686	***	4.276		181.720	***	3.288	
Total Variance	179.883				185.528			
Number of Level-1 Observations	1029				1912			
Number of Level-2 Units	347				567			
Deviance (-2 x Log Restricted-Likelihood)	8123.24				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.034				0.021			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.98				13.11			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	61.29				76.54			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.13				17.68			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.2.1.3: Contextualised Model: Influence of homework on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Time Spent on Homework Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	3.900	***	0.924	0.32	5.805	***	0.570	0.44
Age within cohort	0.378	***	0.144	0.20	0.256	***	0.082	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	3.851		2.739	0.31	0.436		1.529	0.03
Black Caribbean heritage	-3.427		3.035	-0.28	-0.204		1.506	-0.02
Black African heritage	-3.132		4.800	-0.26	-2.378		1.966	-0.18
Any other ethnic minority	0.220		4.029	0.02	0.660		1.825	0.05
Indian heritage	2.085		4.031	0.17	4.130	**	1.911	0.31
Pakistani heritage	-3.776		2.844	-0.31	0.709		1.329	0.05
Bangladeshi heritage	4.695		5.330	0.38	4.876	*	2.743	0.37
Mixed race	-0.171		2.000	-0.01	-1.492		1.161	-0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	6.565		4.337	0.53	-1.405		2.320	-0.11
Low birth weight (1501-2500g)	-3.877	*	2.003	-0.32	-0.824		1.074	-0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	2.003		1.378	0.16	1.736	*	0.918	0.13
2 Siblings	1.583		1.554	0.13	1.014		0.999	0.08
3+ Siblings	2.754		1.846	0.22	0.023		1.151	0.00
Behavioural History: Ref = No Beh Probs								
1 Behavioural Problem	-3.575	**	1.532	-0.29	-3.844	***	0.898	-0.29
2+ Behavioural Problems	-7.294	**	3.002	-0.59	-4.144	**	1.971	-0.31
Highest SES (KS2) Ref = Unemp. No wkg								
Unskilled	-1.776		3.813	-0.14	-0.136		2.197	-0.01
Semi-Skilled	-2.261		2.249	-0.18	-1.215		1.254	-0.09
Skilled Manual	-0.119		1.918	-0.01	0.665		1.074	0.05
Skilled, Non-Manual	3.273	*	1.827	0.27	3.994	***	0.987	0.30
Other Professional, Non-Manual	2.525		1.693	0.21	3.946	***	0.980	0.30
Professional, Non-Manual	5.701	***	2.097	0.46	5.880	***	1.283	0.44
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	1.142		3.416	0.09	2.573		2.264	0.19
Vocational	-1.572		1.820	-0.13	1.086		0.942	0.08
16 academic	0.725		1.557	0.06	2.174	***	0.810	0.16
18 academic	1.860		2.112	0.15	3.942	***	1.193	0.30
Degree or equivalent	2.770		1.931	0.23	5.835	***	1.175	0.44
Higher degree	3.481		2.481	0.28	6.500	***	1.689	0.49
Marital Status of Parent Ref = Married								
Single	-1.345		1.489	-0.11	-1.668	*	0.905	-0.13
Separated/Divorced	0.050		2.227	0.00	-0.911		1.230	-0.07
Living with partner	-1.644		1.418	-0.13	-2.192	**	0.890	-0.16
Widow/ widower	-3.366		5.388	-0.27	-0.891		2.746	-0.07
Early Years HLE Index	0.155	**	0.067	0.19	0.235	***	0.041	0.27
Time Spent on Homework: Ref = None								
Less than 1/2 hour	7.281	***	2.401	0.59	4.720	***	1.419	0.35
1/2 - 1 hours	8.677	***	2.260	0.71	5.815	***	1.271	0.44
1 - 2 hours	9.841	***	2.334	0.80	6.916	***	1.400	0.52
2 - 3 hours	13.866	***	2.913	1.13	9.554	***	1.800	0.72
Over 3 hours	8.311	*	4.660	0.68	6.111	*	3.233	0.46
Intercept	84.454	***	3.342		81.090	***	1.941	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.349	***	2.834		5.802	***	1.068	
Variance (Level 1)	150.600	***	4.251		177.115	***	2.592	
Total Variance	163.949				182.917			
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6651.61				.			
VPC/ Intra-Class Correlation (ICC)	0.081				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	28.01				15.31			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	16.60				64.26			
Proportion of Total Variance Reduction	27.20				18.84			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

In general ‘self-regulation’ at KS3 increased with the amount of time students reported they spent doing homework although there was a ceiling effect (Table 3.2.1.3). There appear to be diminishing returns associated with additional time spent on homework once this amount of time has exceeded three hours on an ordinary week day. An excessive amount of time allocated to homework on a regular basis may signal the presence of academic difficulties or other special education needs. Alternatively, it may be the artefact of reduced sample size for this group or exaggerated self-reports.

The largest differentials in ‘self-regulation’ are between students who do not ordinarily allocate any amount of time to completing homework assignments, and those who generally spend between two and three hours on homework: 13.9 points on the original data (ES=1.13), and 9.6 points on the imputed data (ES=0.72), respectively.

Those who ordinarily do not allocate any amount of time to homework score lowest on ‘self-regulation’ followed by those who spend less than half an hour on completing assignments. Students who spend over three hours on homework achieve similar levels of ‘self-regulation’ as those who allocate between 1/2 and 1 hour, suggesting that perseverance among students with potential academic difficulties may generate significant payoffs in the long run.

The relationship between homework and ‘self-regulation’ may not be unidirectional. Ramdass & Zimmerman (2011) speculate that doing homework helps train ‘self-regulation’ skills. They argue that skills such as time management abilities, setting goals and following through, perseverance, and stamina are learned behaviours that gradually develop over time and reinforce individual autonomy. However, self-regulated students may spend more time on homework precisely as a result of possessing attributes such as persistence in the face of difficulties, self-discipline, and responsibility. Whether the relationships between homework and self-regulatory behaviours are reciprocal or not the results indicate better outcomes when more time is spent doing homework.

Section 3.2.2: The influence of HLE and homework on pro-social behaviour

TABLE 3.2.2.1: Contextualised Model: Influence of early years HLE on pro-social behaviour

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]:Early Years HLE (Categorical)								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.639	***	0.854	0.51	8.311	***	0.584	0.61
Age within cohort	0.070		0.133	0.03	0.166	*	0.087	0.08
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	7.803	**	3.972	0.60	-0.168		2.496	-0.01
Low birth weight (1501-2500g)	0.679		1.731	0.05	-0.008		1.061	-0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.520		1.285	0.12	1.478	*	0.895	0.11
2 Siblings	0.916		1.431	0.07	0.555		0.977	0.04
3+ Siblings	0.356		1.678	0.03	-0.237		1.138	-0.02
Ethnicity: Ref = White UK heritage								
White European heritage	0.319		2.541	0.02	-0.025		1.488	-0.00
Black Caribbean heritage	-4.010		2.978	-0.31	-1.203		1.562	-0.09
Black African heritage	0.199		3.667	0.02	-1.680		1.984	-0.12
Any other ethnic minority	0.734		3.410	0.06	-0.286		1.716	-0.02
Indian heritage	1.426		3.627	0.11	2.177		1.914	0.16
Pakistani heritage	-1.436		2.639	-0.11	-0.498		1.366	-0.04
Bangladeshi heritage	4.689		4.861	0.36	3.854		2.703	0.28
Mixed race	-1.201		1.841	-0.09	-1.449		1.217	-0.11
Behavioural History: Ref = No Beh Probs								
1 Behavioural Problem	-2.668	*	1.377	-0.20	-3.760	***	0.896	-0.28
2+ Behavioural Problems	-4.159		2.780	-0.32	-2.794		1.915	-0.21
Highest SES (KS2) Ref Unempd/No wking								
Unskilled	-2.470		3.194	-0.19	-1.047		2.214	-0.08
Semi-Skilled	-3.146		1.947	-0.24	-1.306		1.145	-0.10
Skilled Manual	-1.045		1.776	-0.08	0.943		1.051	0.07
Skilled, Non-Manual	2.670		1.678	0.20	2.744	***	0.986	0.20
Other Professional, Non-Manual	1.490		1.548	0.11	3.090	***	0.994	0.23
Professional, Non-Manual	2.852		1.959	0.22	4.212	***	1.342	0.31
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	-0.219		3.266	-0.02	0.733		2.308	0.05
Vocational	-2.203		1.596	-0.17	0.131		0.952	0.01
16 academic	1.359		1.377	0.10	2.028	***	0.780	0.15
18 academic	2.584		1.879	0.20	3.009	***	1.161	0.22
Degree or equivalent	4.409	**	1.770	0.34	4.900	***	1.102	0.36
Higher degree	5.341	**	2.356	0.41	4.795	***	1.681	0.35
Marital Status of Parent Ref = Married								
Single	-1.977		1.345	-0.15	-1.368		0.935	-0.10
Separated/Divorced	-0.914		1.881	-0.07	-1.432		1.244	-0.11
Living with partner	-1.500		1.326	-0.11	-1.794	**	0.876	-0.13
Widow/ widower	2.072		4.454	0.16	0.424		2.698	0.03
Early Years HLE: Ref = Very Low (0-13)								
Low (Index Values: 14-19)	2.310		1.799	0.18	1.816	*	1.087	0.13
Average (Index Values: 20-24)	1.702		1.838	0.13	1.368		1.067	0.10
High (Index Values: 25-32)	3.959	**	1.790	0.30	3.633	***	1.053	0.27
Very High (Index Values: 33-45)	4.808	**	2.007	0.37	4.036	***	1.302	0.30
Intercept	92.342	***	2.467		90.094	***	1.603	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.401	***	2.749		7.322	***	1.182	
Variance (Level 1)	171.947	***	4.151		183.230	***	2.628	
Total Variance	185.348				190.552			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8916.63				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.072				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.35				12.77			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	23.95				52.90			
Proportion of Total Variance Reduction	17.86				15.53			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

The quality of the early years HLE appears to shape students' 'pro-social' behaviour at the end of KS3, although the differences in 'pro-social' behaviour among different groups of students are less pronounced than those for 'self-regulation'. Effect size corresponding to difference between extreme categories is ES=0.37 on the original data, and ES=0.30 on the imputed data.

Similarly to the results for 'self-regulation', the quality of KS2 HLE only emerges as a significant predictor (again, exclusively on the imputed data) if the quality of early years HLE is not taken into account.

These findings suggest that patterns of 'self-regulation' and 'pro-social' are firmly established during the early years, and cannot be subsequently modified to any significant extent by changing parenting practices between age 11 and age 14.

Similar to 'self-regulation' students showed better 'pro-social' behaviour the more time they spend on homework, however the effect sizes were slightly lower(ES=0.34 to ES=1.02 original, ES=0.24 to ES=0.62 imputed). Again there was a ceiling effect; students who spent over three hours on homework were not statistically different to those who did no homework.

TABLE 3.2.2.2: Contextual Model: Influence of KS 2 HLE pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Key Stage 2 HLE Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	7.746	***	0.878	0.59	8.981	***	0.678	0.66
Age within cohort	0.174		0.140	0.08	0.167		0.108	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	0.317		2.603	0.02	0.223		1.932	0.02
Black Caribbean heritage	-4.052		3.516	-0.31	-3.203		2.356	-0.24
Black African heritage	-0.387		3.802	-0.03	-3.152		2.677	-0.23
Any other ethnic minority	-0.298		3.512	-0.02	-1.482		2.673	-0.11
Indian heritage	1.366		3.533	0.10	0.339		2.381	0.03
Pakistani heritage	-3.786		2.810	-0.29	-1.792		2.064	-0.13
Bangladeshi heritage	4.922		4.898	0.37	2.830		3.156	0.21
Mixed race	-1.925		2.055	-0.15	-0.781		1.698	-0.06
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	7.427	*	4.173	0.56	3.095		3.172	0.23
Low birth weight (1501-2500g)	0.360		1.881	0.03	-0.647		1.392	-0.05
Number of Siblings: Ref = No Siblings								
1 Sibling	1.039		1.335	0.08	1.500		1.070	0.11
2 Siblings	-0.006		1.483	-0.00	0.108		1.152	0.01
3+ Siblings	0.125		1.741	0.01	-0.010		1.336	-0.00
Behavioural History: Ref = No Behav Probs								
1 Behavioural Problem	-3.354	**	1.451	-0.25	-4.017	***	1.125	-0.30
2+ Behavioural Problems	-4.316		2.865	-0.33	-4.065	*	2.322	-0.30
Highest SES (KS2) Ref = Unemplyd/No woking								
Unskilled	-2.368		3.240	-0.18	-3.062		2.834	-0.23
Semi-Skilled	-1.978		2.086	-0.15	-1.210		1.576	-0.09
Skilled Manual	0.193		1.897	0.01	0.398		1.390	0.03
Skilled, Non-Manual	3.701	**	1.752	0.28	2.862	**	1.271	0.21
Other Professional, Non-Manual	1.867		1.629	0.14	2.277	*	1.224	0.17
Professional, Non-Manual	3.152		2.063	0.24	3.256	**	1.583	0.24
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	1.324		3.454	0.10	3.583		2.818	0.26
Vocational	-1.259		1.686	-0.10	0.570		1.263	0.04
16 academic	2.246		1.461	0.17	2.340	**	1.060	0.17
18 academic	4.245	**	1.909	0.32	4.182	***	1.469	0.31
Degree or equivalent	6.150	***	1.818	0.47	6.056	***	1.388	0.45
Higher degree	8.056	***	2.449	0.61	7.136	***	1.845	0.53
Marital Status of Parent Ref = Married								
Single	-1.424		1.418	-0.11	-2.050	*	1.070	-0.15
Separated/Divorced	-1.204		1.937	-0.09	-2.165		1.453	-0.16
Living with partner	-1.300		1.423	-0.10	-2.398	**	1.081	-0.18
Widow/ widower	2.322		4.724	0.18	0.474		3.171	0.04
Key Stage 2 HLE: Global Index	0.584		0.971	0.04	1.262	*	0.719	0.09
Intercept	92.464	***	2.764		90.741	***	2.159	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.366	***	2.836		7.061	***	1.678	
Variance (Level 1)	174.814	***	4.420		183.323	***	3.359	
Total Variance	187.180				190.384			
Number of Level-1 Observations	1029				1912			
Number of Level-2 Units	347				567			
Deviance (-2 x Log Restricted-Likelihood)	8155.36				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.066				0.037			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	15.97				12.73			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	29.82				54.58			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.05				15.61			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.2.2.3: Contextual Model: Influence of homework on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Time Spent on Homework Model								
FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	5.189	***	0.930	0.42	7.994	***	0.579	0.59
Age within cohort	0.262	*	0.145	0.14	0.167	*	0.086	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	1.410		2.754	0.11	0.112		1.483	0.01
Black Caribbean heritage	-5.533	*	3.056	-0.45	-1.390		1.580	-0.10
Black African heritage	-0.918		4.834	-0.07	-2.121		1.987	-0.16
Any other ethnic minority	-3.185		4.056	-0.26	-0.502		1.706	-0.04
Indian heritage	-1.413		4.059	-0.11	1.875		1.913	0.14
Pakistani heritage	-3.451		2.866	-0.28	-0.512		1.359	-0.04
Bangladeshi heritage	2.283		5.365	0.19	3.707		2.716	0.28
Mixed race	-0.478		2.013	-0.04	-1.510		1.232	-0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	8.941	**	4.358	0.73	0.094		2.505	0.01
Low birth weight (1501-2500g)	-2.052		2.013	-0.17	-0.013		1.054	-0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.566		1.385	0.13	1.526	*	0.899	0.11
2 Siblings	1.592		1.562	0.13	0.661		0.972	0.05
3+ Siblings	2.714		1.856	0.22	-0.064		1.123	-0.00
Behavioural History:Ref = No Behav Probs								
1 Behavioural problem	-2.227		1.540	-0.18	-3.589	***	0.902	-0.27
2+ Behavioural problems	-4.741		3.018	-0.39	-2.442		1.910	-0.18
Highest SES (KS2) Ref = Unempd/No wkg								
Unskilled	-1.264		3.831	-0.10	-0.978		2.225	-0.07
Semi-Skilled	-1.994		2.262	-0.16	-1.406		1.151	-0.10
Skilled Manual	-0.039		1.929	-0.00	0.838		1.045	0.06
Skilled, Non-Manual	2.780		1.837	0.23	2.693	***	0.992	0.20
Other Professional, Non-Manual	1.845		1.702	0.15	2.922	***	1.000	0.22
Professional, Non-Manual	4.319	**	2.108	0.35	4.049	***	1.336	0.30
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	0.374		3.436	0.03	0.717		2.345	0.05
Vocational	-2.889		1.830	-0.24	0.019		0.943	0.00
16 academic	-0.170		1.566	-0.01	2.013	***	0.779	0.15
18 academic	-0.201		2.125	-0.02	2.909	**	1.146	0.22
Degree or equivalent	0.499		1.943	0.04	4.510	***	1.106	0.34
Higher degree	1.187		2.496	0.10	4.088	**	1.678	0.30
Marital Status of Parent/Ref = Married								
Single	-0.751		1.498	-0.06	-1.255		0.933	-0.09
Separated/Divorced	-1.831		2.238	-0.15	-1.293		1.239	-0.10
Living with partner	-1.889		1.425	-0.15	-1.552	*	0.861	-0.12
Widow/ widower	-6.655		5.421	-0.54	-0.188		2.722	-0.01
Early Years HLE Index (Continuous scale)	0.153	**	0.067	0.19	0.164	***	0.041	0.19
Time Spent on Homework: Ref = None								
Less than 1/2 hour	4.141	*	2.412	0.34	3.203	**	1.552	0.24
1/2 - 1 hours	7.610	***	2.270	0.62	4.814	***	1.362	0.36
1 - 2 hours	8.299	***	2.345	0.68	5.830	***	1.402	0.43
2 - 3 hours	12.596	***	2.929	1.02	8.307	***	1.951	0.62
Over 3 hours	7.422		4.688	0.60	5.284		3.782	0.39
Intercept	87.000	***	3.361		84.185	***	1.947	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	15.469	***	3.220		7.278	***	1.169	
Variance (Level 1)	151.047	***	4.365		180.826	***	2.620	
Total Variance	166.515				188.104			
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6661.62				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.093				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.39				13.91			
Proportion of Level-2 Variance Reduction	12.21				53.18			
Proportion of Total Variance Reduction	26.21				16.62			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 3.2.3: The influence of HLE and homework on hyperactivity

TABLE 3.2.3.1: Contextualised Model: Influence of early years HLE on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Early Years HLE (Categorical) Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.530	***	0.838	-0.50	-7.271	***	0.531	-0.54
Age within cohort	-0.058		0.131	-0.03	-0.161	*	0.084	-0.08
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	-5.957		3.920	-0.46	1.578		2.267	0.12
Low birth weight (1501-2500g)	1.339		1.710	0.10	0.867		1.120	0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.253		1.267	-0.10	-2.043	**	0.897	-0.15
2 Siblings	-1.250		1.411	-0.10	-1.530		0.949	-0.11
3+ Siblings	1.033		1.655	0.08	0.134		1.105	0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-1.689		2.506	-0.13	-0.239		1.512	-0.02
Black Caribbean heritage	1.572		2.920	0.12	0.240		1.503	0.02
Black African heritage	2.539		3.593	0.19	1.900		1.960	0.14
Any other ethnic minority	-0.926		3.355	-0.07	-0.341		1.777	-0.03
Indian heritage	-5.420		3.564	-0.41	-4.408	**	1.973	-0.33
Pakistani heritage	1.025		2.581	0.08	-1.218		1.324	-0.09
Bangladeshi heritage	-8.936	*	4.794	-0.68	-6.405	**	2.700	-0.48
Mixed race	0.582		1.813	0.04	1.479		1.181	0.11
Behavioural History: Ref = No Beh Probs								
1 Behavioural problem	3.432	**	1.359	0.26	4.846	***	0.893	0.36
2+ Behavioural problems	8.375	***	2.741	0.64	5.902	***	1.954	0.44
Highest SES (KS2) Ref = Unempd/No wkg								
Unskilled	1.505		3.156	0.12	1.845		2.181	0.14
Semi-Skilled	4.373	**	1.920	0.33	2.356	**	1.108	0.17
Skilled Manual	2.130		1.750	0.16	-0.431		1.046	-0.03
Skilled, Non-Manual	-1.727		1.655	-0.13	-2.686	***	0.999	-0.20
Other Professional, Non-Manual	-0.524		1.526	-0.04	-3.252	***	0.949	-0.24
Professional, Non-Manual	-0.883		1.931	-0.07	-3.798	***	1.276	-0.28
Mother's Highest Qual (E Yrs):Ref = None								
Other professional/ Misc.	1.761		3.222	0.13	-1.997		2.241	-0.15
Vocational	1.404		1.572	0.11	-1.061		0.939	-0.08
16 academic	-0.746		1.357	-0.06	-1.957	**	0.791	-0.15
18 academic	-2.000		1.850	-0.15	-3.397	***	1.158	-0.25
Degree or equivalent	-4.033	**	1.740	-0.31	-5.346	***	1.148	-0.40
Higher degree	-5.170	**	2.314	-0.40	-5.751	***	1.635	-0.43
Marital Status of Parent Ref = Married								
Single	4.798	***	1.326	0.37	2.799	***	0.917	0.21
Separated/Divorced	1.598		1.860	0.12	2.784	**	1.232	0.21
Living with partner	2.280	*	1.309	0.17	2.805	***	1.038	0.21
Widow/ widower	4.149		4.385	0.32	-0.405		2.787	-0.03
Early Years HLE: Ref = Very Low (0-13)								
Low (Index Values: 14-19)	-0.349		1.774	-0.03	-1.166		1.056	-0.09
Average (Index Values: 20-24)	-1.335		1.814	-0.10	-1.524		1.040	-0.11
High (Index Values: 25-32)	-2.951	*	1.765	-0.23	-3.425	***	1.074	-0.25
Very High (Index Values: 33-45)	-4.304	**	1.980	-0.33	-4.682	***	1.305	-0.35
Intercept	104.246	***	2.428		109.394	***	1.525	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.746	***	2.118		5.177	***	1.058	
Variance (Level 1)	170.719	***	4.012		181.570	***	2.547	
Total Variance	178.464				186.748			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8883.88				.			
VPC/ Intra-Class Correlation (ICC)	0.043				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.23				14.15			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	52.79				62.73			
Total Variance Reduction [Compared to Null Model] (%)	20.75				17.14			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.2.3.2: Contextualised Model: Influence of KS2 HLE on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Key Stage 2 HLE Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-7.068	***	0.882	-0.54	-7.500	***	0.642	-0.56
Age within cohort	-0.102		0.139	-0.05	-0.139		0.104	-0.07
Ethnicity: Ref = White UK heritage								
White European heritage	-2.047		2.605	-0.16	-0.189		1.814	-0.01
Black Caribbean heritage	-0.065		3.449	-0.00	0.789		2.251	0.06
Black African heritage	3.178		3.705	0.24	2.354		2.578	0.18
Any other ethnic minority	-1.066		3.459	-0.08	1.403		2.497	0.11
Indian heritage	-7.077	*	3.680	-0.54	-3.962		2.423	-0.30
Pakistani heritage	0.598		2.810	0.05	-1.937		1.935	-0.15
Bangladeshi heritage	-9.536	**	4.814	-0.73	-5.226	*	3.015	-0.39
Mixed race	1.111		2.015	0.08	-0.054		1.550	-0.00
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<=1500g)	-7.342	*	4.109	-0.56	-3.939		2.976	-0.30
Low birth weight (1501-2500g)	1.818		1.851	0.14	2.623	*	1.416	0.20
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.962		1.322	-0.07	-2.151	**	0.987	-0.16
2 Siblings	-0.934		1.477	-0.07	-1.320		1.095	-0.10
3+ Siblings	0.567		1.742	0.04	0.082		1.272	0.01
Behavioural History Ref No Beha Probs								
1 Behavioural problem	3.062	**	1.434	0.23	4.523	***	1.100	0.34
2+ Behavioural problems	8.041	***	2.876	0.61	7.394	***	2.260	0.55
Highest SES KS2Ref Unempd/No wking								
Unskilled	0.382		3.265	0.03	1.767		2.755	0.13
Semi-Skilled	3.389	*	2.059	0.26	2.438	*	1.476	0.18
Skilled Manual	1.622		1.881	0.12	0.612		1.361	0.05
Skilled, Non-Manual	-2.653		1.740	-0.20	-2.373	*	1.237	-0.18
Other Professional, Non-Manual	-1.053		1.620	-0.08	-1.912		1.175	-0.14
Professional, Non-Manual	-1.403		2.042	-0.11	-2.295		1.525	-0.17
Mother's Highest Qual (E Yrs)Ref =None								
Other professional/ Misc.	1.429		3.417	0.11	-3.027		2.689	-0.23
Vocational	0.856		1.683	0.07	-1.244		1.218	-0.09
16 academic	-1.441		1.459	-0.11	-1.998	*	1.038	-0.15
18 academic	-2.795		1.930	-0.21	-3.469	**	1.446	-0.26
Degree or equivalent	-5.016	***	1.850	-0.38	-5.553	***	1.348	-0.42
Higher degree	-6.763	***	2.451	-0.51	-6.576	***	1.822	-0.49
Marital Status of Parent Ref = Married								
Single	4.009	***	1.396	0.30	3.977	***	1.029	0.30
Separated/Divorced	1.125		1.931	0.09	3.435	**	1.481	0.26
Living with partner	1.587		1.413	0.12	3.418	***	1.091	0.26
Widow/ widower	4.960		4.632	0.38	0.690		3.063	0.05
Early Years HLE (Continuous scale)	-0.155	**	0.065	-0.18	-0.157	***	0.049	-0.18
Key Stage 2 HLE (Global Index)	-0.954		0.974	-0.07	-1.425	**	0.719	-0.10
Intercept	109.484	***	2.962		111.890	***	2.150	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.399	**	2.022		1.873		1.463	
Variance (Level 1)	172.899	***	4.263		177.759	***	3.211	
Total Variance	178.298				179.632			
Number of Level-1 Observations	1011				1912			
Number of Level-2 Units	345				567			
Deviance (-2 x Log Restricted-Likelihood)	7972.86				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.030				0.010			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.19				15.95			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	67.09				86.52			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.82				20.30			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Whereas even smaller quality increases could make a difference on 'self-regulation' scores, a high or very high quality early years HLE appears to be a necessary for a significant reduction in students' hyperactivity in Year 9. The enduring impact of the early years HLE is modest for hyperactivity with ES=-0.33 (original) and ES=-0.35 (imputed) for the very high category.

Contrary to the findings for 'self-regulation' and 'pro-social' behaviour, the quality of the KS2 HLE does seem to have an independent influence on hyperactivity (imputed data) even when socio-demographic, behavioural history and the early years HLE are taken into account. Controlling for background characteristics and assuming average quality of the early years HLE, each additional unit increase in the global KS2 HLE index is associated with a 1.4 point reduction in a student's predicted level of hyperactivity in Year 9 (ES=-0.10). The magnitude of the impact is rather modest, but it nevertheless suggests that continued parental involvement throughout KS2 could make a difference for students who are predisposed to inattention/hyperactivity.

The amount of time allocated to homework was also significantly related to students' 'hyperactivity', with students spending higher amounts of time on completing home assignments exhibiting proportionately lower levels of 'hyperactivity'. Again, the directionality of the influence is open to question. Hyperactive students may be more prone to distractions and as a result are unable to sustain focus on homework assignments over extended periods of time. By the same token, students who do not effectively manage distractions and follow tasks through to completion are likely to display higher levels of 'hyperactivity' over time.

A similar pattern of diminishing returns (see self-regulation) was evident once the 3 hour ceiling was reached. Students who reported spending more than three hours on homework may have learning difficulties related to inattentiveness. However, although they do not fare better than those who spend 2-3 hours on homework, their 'hyperactivity' scores are approximately one standard deviation lower compared to those of students who do not do any homework and this difference is statistically significant at a high probability level. This suggests that homework may be an efficient method to channel students' focus on important tasks and mitigate 'hyperactivity'.

TABLE 3.2.3.3: Contextualised Model: Influence of homework on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Time Spent on Homework Model								
FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA(Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	-5.328	***	0.901	-0.45	-7.021	***	0.535	-0.53
Age within cohort	-0.230		0.140	-0.12	-0.164	**	0.084	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-4.189		2.668	-0.35	-0.384		1.537	-0.03
Black Caribbean heritage	4.216		2.959	0.35	0.407		1.512	0.03
Black African heritage	6.863		4.681	0.58	2.398		1.954	0.18
Any other ethnic minority	-1.308		3.928	-0.11	-0.163		1.783	-0.01
Indian heritage	-0.719		3.930	-0.06	-4.142	**	1.969	-0.31
Pakistani heritage	3.312		2.774	0.28	-1.262		1.326	-0.09
Bangladeshi heritage	-8.911	*	5.196	-0.75	-6.320	**	2.751	-0.47
Mixed race	-0.396		1.949	-0.03	1.482		1.176	0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/v low weight (<= 1500g)	-5.829		4.222	-0.49	1.337		2.242	0.10
Low birth weight, i.e. 1501-2500 g	3.173		1.951	0.27	0.869		1.116	0.07
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.993		1.342	-0.08	-2.029	**	0.900	-0.15
2 Siblings	-1.316		1.513	-0.11	-1.555		0.951	-0.12
3+ Siblings	-0.814		1.798	-0.07	0.039		1.093	0.00
Behavioural History Ref No Behav Probs								
1 Behavioural Problem	3.019	**	1.492	0.25	4.649	***	0.893	0.35
2+ Behavioural Problems	8.213	***	2.923	0.69	5.485	***	1.961	0.41
Highest SES KS2 Ref Unempyd/No wkg								
Unskilled	3.679		3.712	0.31	1.961		2.244	0.15
Semi-Skilled	2.315		2.191	0.19	2.418	**	1.136	0.18
Skilled Manual	1.263		1.869	0.11	-0.294		1.066	-0.02
Skilled, Non-Manual	-1.074		1.779	-0.09	-2.619	**	1.036	-0.20
Other Professional, Non-Manual	-0.588		1.649	-0.05	-3.083	***	0.986	-0.23
Professional, Non-Manual	-2.250		2.043	-0.19	-3.641	***	1.279	-0.27
Mother's Highest Qual E Ys Ref None								
Other professional/ Misc.	2.025		3.328	0.17	-1.861		2.235	-0.14
Vocational	1.619		1.773	0.14	-0.937		0.937	-0.07
16 academic	-0.181		1.517	-0.02	-1.890	**	0.788	-0.14
18 academic	0.124		2.058	0.01	-3.255	***	1.155	-0.24
Degree or equivalent	-1.758		1.882	-0.15	-4.977	***	1.155	-0.37
Higher degree	-2.132		2.418	-0.18	-5.067	***	1.640	-0.38
Marital Status of Parent Ref = Married								
Single	3.059	**	1.451	0.26	2.718	***	0.909	0.20
Separated/Divorced	0.936		2.168	0.08	2.690	**	1.222	0.20
Living with partner	1.621		1.381	0.14	2.562	**	1.031	0.19
Widow/ widower	6.093		5.250	0.51	0.147		2.741	0.01
Early Years HLE (Continuous scale)	-0.091		0.065	-0.12	-0.187	***	0.041	-0.21
Time Spent on Homework Ref = None								
Less than 1/2 hour	-9.233	***	2.337	-0.77	-5.228	***	1.468	-0.39
1/2 - 1 hours	-11.527	***	2.200	-0.97	-6.422	***	1.249	-0.48
1 - 2 hours	-10.909	***	2.272	-0.92	-6.787	***	1.452	-0.51
2 - 3 hours	-14.842	***	2.837	-1.25	-9.464	***	1.828	-0.71
Over 3 hours	-10.467	**	4.541	-0.88	-7.063	**	3.263	-0.53
Intercept	112.961	***	3.255		117.269	***	1.875	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	14.044	***	2.617		5.438	***	1.069	
Variance (Level 1)	142.02	***	3.967		178.355	***	2.534	
Total Variance	156.07				183.793			
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likehood)	6609.3				.			
VPC/ Intra-Class Correlation (ICC)	0.090				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	31.97				15.67			
Proportion of Level-2 Variance	14.40				60.86			
Proportion of Total Variance Reduction	30.69				18.46			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 3.2.4: The impact of HLE and homework on anti-social behaviour

TABLE 3.2.4.1: Contextual Model: Influence of EY HL on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Early Years HLE (Continuous)								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.524	***	0.825	-0.35	-5.777	***	0.621	-0.42
Age within cohort	0.056		0.129	0.03	-0.060		0.088	-0.03
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<= 1500g)	-5.054		3.880	-0.39	1.937		2.455	0.14
Low birth weight, i.e. 1501-2500 g	2.342		1.691	0.18	1.432		1.217	0.10
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.582		1.252	-0.12	-1.660	*	0.922	-0.12
2 Siblings	-1.006		1.393	-0.08	-0.947		1.021	-0.07
3+ Siblings	1.274		1.634	0.10	0.626		1.268	0.05
Ethnicity: Ref = White UK heritage								
White European heritage	-1.594		2.478	-0.12	-0.329		1.567	-0.02
Black Caribbean heritage	1.596		2.868	0.12	0.734		1.564	0.05
Black African heritage	2.129		3.531	0.16	2.324		2.296	0.17
Any other ethnic minority	1.854		3.302	0.14	0.903		2.028	0.06
Indian heritage	-3.763		3.512	-0.29	-2.104		2.060	-0.15
Pakistani heritage	-0.520		2.540	-0.04	-1.313		1.431	-0.09
Bangladeshi heritage	-6.351		4.740	-0.49	-4.692	*	2.822	-0.34
Mixed race	1.412		1.789	0.11	1.686		1.430	0.12
Behavioural History Ref No Behav Probs								
1 Behavioural Problem	2.560	*	1.343	0.20	4.466	***	0.987	0.32
2+ Behavioural Problems	5.353	**	2.711	0.41	4.580	**	2.053	0.33
Highest SES (KS2)Ref Unempyd/No wkg								
Unskilled	1.915		3.120	0.15	2.933		2.277	0.21
Semi-Skilled	3.557	*	1.896	0.27	1.351		1.212	0.10
Skilled Manual	2.280		1.723	0.18	-1.001		1.167	-0.07
Skilled, Non-Manual	-0.790		1.634	-0.06	-2.809	***	1.056	-0.20
Other Professional, Non-Manual	0.654		1.507	0.05	-2.650	***	1.002	-0.19
Professional, Non-Manual	-0.181		1.909	-0.01	-3.518	***	1.349	-0.25
Mother's Highest Qual (E Ys)Ref = None								
Other professional/ Misc.	3.278		3.189	0.25	0.269		2.395	0.02
Vocational	1.496		1.548	0.12	-0.228		1.008	-0.02
16 academic	-1.314		1.333	-0.10	-1.819	**	0.879	-0.13
18 academic	-2.074		1.824	-0.16	-2.884	**	1.307	-0.21
Degree or equivalent	-4.250	**	1.719	-0.33	-5.106	***	1.219	-0.37
Higher degree	-4.408	*	2.288	-0.34	-4.976	***	1.734	-0.36
Marital Status of Paren Ref = Married								
Single	4.024	***	1.307	0.31	2.130	**	1.001	0.15
Separated/Divorced	2.918		1.840	0.22	2.456	*	1.275	0.18
Living with partner	1.137		1.294	0.09	1.952	*	1.113	0.14
Widow/ widower	2.573		4.332	0.20	-1.883		2.974	-0.14
Early Years HLE (Continuous scale)	-0.121	**	0.060	-0.14	-0.111	**	0.050	-0.12
Intercept	103.938	***	2.389		108.383	***	1.613	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.948	**	1.983		5.959	***	1.290	
Variance (Level 1)	169.099	***	3.978		193.690	***	2.882	
Total Variance	174.047				199.650			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8875.51				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.028				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	20.08				9.24			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	63.99				50.11			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	22.76				11.41			
Significance Levels: * p<0.10, ** p<0.05, *** p<0.01								

TABLE 3.2.4.2: Contextual Model: Influence of KS2 HLE on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Key Stage 2 HLE Model 2								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.840	***	0.881	-0.37	-5.485	***	0.687	-0.41
Age within cohort	0.051		0.139	0.02	-0.036		0.111	-0.02
Ethnicity: Ref = White UK heritage								
White European heritage	-2.074		2.600	-0.16	-1.139		1.999	-0.09
Black Caribbean heritage	-0.473		3.442	-0.04	0.691		2.298	0.05
Black African heritage	1.953		3.699	0.15	2.713		2.857	0.20
Any other ethnic minority	0.903		3.452	0.07	1.239		2.999	0.09
Indian heritage	-6.090	*	3.673	-0.46	-2.832		2.444	-0.21
Pakistani heritage	-0.846		2.805	-0.06	-2.449		2.053	-0.18
Bangladeshi heritage	-7.240		4.804	-0.55	-4.224		3.159	-0.32
Mixed race	2.417		2.011	0.18	0.409		1.684	0.03
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/v low weight(<= 1500g)	-6.190		4.099	-0.47	-3.816		3.236	-0.29
Low birth weight (1501-2500g)	3.492	*	1.847	0.27	3.572	**	1.487	0.27
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.120		1.319	-0.09	-1.518		1.045	-0.11
2 Siblings	-0.372		1.474	-0.03	-0.249		1.181	-0.02
3+ Siblings	0.855		1.738	0.07	0.948		1.335	0.07
Behavioural History Ref No Beh Probs								
1 Behavioural problem	2.012		1.431	0.15	3.389	***	1.205	0.25
2+ Behavioural problems	3.560		2.869	0.27	4.551	*	2.357	0.34
Highest SES KS2Ref=Unempd/No wkg								
Unskilled	1.149		3.258	0.09	3.180		2.817	0.24
Semi-Skilled	2.186		2.055	0.17	0.836		1.589	0.06
Skilled Manual	1.325		1.877	0.10	0.247		1.438	0.02
Skilled, Non-Manual	-1.884		1.736	-0.14	-2.193	*	1.298	-0.16
Other Professional, Non-Manual	0.230		1.616	0.02	-1.218		1.271	-0.09
Professional, Non-Manual	-0.546		2.038	-0.04	-1.707		1.608	-0.13
Mother's Highest Qual(E Yrs)Ref None								
Other professional/ Misc.	2.937		3.409	0.22	-0.422		2.778	-0.03
Vocational	0.979		1.679	0.07	-0.176		1.290	-0.01
16 academic	-1.918		1.456	-0.15	-1.416		1.150	-0.11
18 academic	-2.724		1.926	-0.21	-2.736	*	1.597	-0.20
Degree or equivalent	-5.350	***	1.847	-0.41	-5.005	***	1.463	-0.37
Higher degree	-5.641	**	2.447	-0.43	-4.937	**	1.924	-0.37
Marital Status of Parent Ref = Married								
Single	3.427	**	1.393	0.26	3.423	***	1.181	0.26
Separated/Divorced	2.322		1.927	0.18	2.973	*	1.535	0.22
Living with partner	0.994		1.410	0.08	2.482	**	1.128	0.19
Widow/ widower	3.061		4.622	0.23	-1.535		3.279	-0.11
Early Years HLe (Continuous scale)	-0.114	*	0.064	-0.13	-0.098	*	0.052	-0.11
Key Stage 2 HLE Global Index	-0.334		0.972	-0.02	-1.554	**	0.758	-0.11
Intercept	105.777	***	2.956		108.636	***	2.291	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.829	**	2.220		4.176		1.906	
Variance (Level 1)	171.785	***	4.299		178.634	***	3.767	
Total Variance	177.613				182.810			
Number of Level-1 Observations	1011				1912			
Number of Level-2 Units	345				567			
Deviance (-2 x Log Restricted-Likelihood)	7968.68				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.033				0.023			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.81				16.30			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	57.58				65.04			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	21.18				18.88			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 3.2.4.3: Contextual model: Influence of homework on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Time Spent on Homework Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-3.564	***	0.878	-0.31	-5.605	***	0.617	-0.40
Age within cohort	-0.074		0.137	-0.04	-0.056		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-4.357	*	2.601	-0.37	-0.330		1.571	-0.02
Black Caribbean heritage	3.423		2.883	0.29	0.831		1.579	0.06
Black African heritage	1.510		4.561	0.13	2.652		2.254	0.19
Any other ethnic minority	0.658		3.828	0.06	1.057		2.025	0.08
Indian heritage	0.114		3.830	0.01	-1.919		2.057	-0.14
Pakistani heritage	0.347		2.702	0.03	-1.175		1.447	-0.08
Bangladeshi heritage	-6.981		5.063	-0.60	-4.563		2.857	-0.33
Mixed race	0.057		1.900	0.00	1.664		1.411	0.12
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/v low weight (<= 1500g)	-4.484		4.118	-0.39	1.746		2.428	0.13
Low birth weight (1501-2500g)	5.266	***	1.902	0.45	1.518		1.222	0.11
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.566		1.308	-0.05	-1.605	*	0.924	-0.12
2 Siblings	-0.587		1.475	-0.05	-0.912		1.021	-0.07
3+ Siblings	-0.646		1.753	-0.06	0.590		1.264	0.04
Behavioural History Ref No Beh Probs								
1 Behavioural problem	2.635	*	1.455	0.23	4.305	***	0.991	0.31
2+ Behavioural problems	4.742	*	2.851	0.41	4.223	**	2.059	0.30
Highest SES KS2 RefUnempd/No wkg								
Unskilled	1.567		3.620	0.13	3.001		2.292	0.22
Semi-Skilled	0.305		2.136	0.03	1.443		1.247	0.10
Skilled Manual	0.349		1.822	0.03	-0.853		1.159	-0.06
Skilled, Non-Manual	-1.993		1.735	-0.17	-2.728	**	1.085	-0.20
Other Professional, Non-Manual	-0.598		1.608	-0.05	-2.509	**	1.016	-0.18
Professional, Non-Manual	-2.536		1.992	-0.22	-3.347	**	1.332	-0.24
Mother's Highest (EYrs)Qual Ref None								
Other professional/ Misc.	1.854		3.245	0.16	0.157		2.403	0.01
Vocational	0.891		1.729	0.08	-0.210		0.994	-0.02
16 academic	-1.089		1.479	-0.09	-1.839	**	0.878	-0.13
18 academic	-0.339		2.006	-0.03	-2.883	**	1.300	-0.21
Degree or equivalent	-2.820		1.834	-0.24	-4.947	***	1.215	-0.36
Higher degree	-2.648		2.356	-0.23	-4.556	***	1.735	-0.33
Marital Status of Parent Ref = Married								
Single	2.466	*	1.415	0.21	2.082	**	0.993	0.15
Separated/Divorced	1.890		2.115	0.16	2.396	*	1.285	0.17
Living with partner	1.411		1.347	0.12	1.761		1.131	0.13
Widow/ widower	9.007	*	5.118	0.77	-1.599		2.947	-0.12
Early Years HLE (Continuous scale)	-0.046		0.064	-0.06	-0.106	**	0.049	-0.12
Time Spent on Homework Ref = None								
Less than 1/2 hour	-5.825	**	2.280	-0.50	-3.847	**	1.583	-0.28
1/2 - 1 hours	-8.518	***	2.146	-0.73	-5.280	***	1.355	-0.38
1 - 2 hours	-6.966	***	2.216	-0.60	-5.415	***	1.395	-0.39
2 - 3 hours	-10.411	***	2.767	-0.89	-7.560	***	1.810	-0.55
Over 3 hours	-3.512		4.426	-0.30	-3.356		3.592	-0.24
Intercept	108.774	***	3.174		112.898	***	1.930	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.563	***	2.657		5.623	***	1.302	
Variance (Level 1)	135.495	***	3.854		192.095	***	2.913	
Total Variance	148.058				197.719			
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likehd)	6567.32				.			
VPC/ Intra-Class Correlation (ICC)	0.085				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	35.96				9.99			
Proportion of Level-2 Variance % Red	8.58				52.92			
Proportion of Total Variance % Reduct	34.29				12.26			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Although there were no statistically significant differences associated with categorising the quality of their early years HLE, there was a statistically significant marginal effect (i.e., an effect associated with one unit increase in the early years HLE index value) when this variable was tested as a continuous scale (ES=-0.14 original; ES=-0.12 imputed).

Similar to 'hyperactivity', the quality of KS2 HLE, after controlling for socio-demographic and behavioural history, has an additional impact in reducing 'anti-social' behaviour, over and beyond the impact of the early years HLE. Continuing good parenting practices throughout Key Stage 2 may help to reduce 'anti-social' behaviour in adolescence.

In general, students who reported spending more time on homework tasks had progressively lower levels of 'anti-social' behaviour. Only students who reported spending over three hours, on a normal week day evening, were statistically indistinguishable from those who did not ordinarily allocate any time to completing homework. It is plausible that students who have high levels of 'anti-social' behaviour frequently lie (by virtue of the operational definition used)[15], and may therefore provide more inaccurate self-reports, and deliberately overstate the amount of time they routinely spend on homework.

[15] According to our operational definition of anti-social behaviour detailed in Section 2, this is one of the items loading very highly on the latent factor.

Section 3.3: Neighbourhood influences on social-behavioural outcomes in Year 9

This section explores the associations between students' neighbourhood and their social-behavioural outcomes at age 14. As children approach adolescence, they are more likely to be influenced by the socio-economic and cultural environments of their neighbourhood as they gain more independence. This wider network of social interactions may help shape their behavioural outcomes through both the overt and subliminal influences of the people around them outside their own home.

Although socialisation and extra-curricular activities may involve travelling outside the immediate neighbourhood there are never-the-less some daily activities that can be heavily influenced by the behaviours, attitudes and reactions of people in the young persons immediate environment. This social embeddedness could lead to stronger influences of the neighbourhood at age 14 than at earlier time points (age 11).

When studying neighbourhood influences it is important to note that the composition of a neighbourhood can be determined by many socio-economic factors such as income and housing affordability.

The neighbourhood environments measures tested were:

- Indices of Multiple Deprivation (IMD, 2004) - a nationwide index combining weighted measures from several domains, such as income, employment status (unemployment or not working due to ill health, or other family circumstances), health and disability, education, skills and training, barriers to housing and services, living environment, and crime.

- Income Deprivation Affecting Children Index (IDACI 2008) - an index that measures the proportion of children aged under sixteen that live in low income households within each super output area (SOA).

- Census statistics - the percentage of White British residents; criminality rates; level of employment and incidence of limiting long-term illness.

The measures were tested in separate models due to partial overlap so as to avoid statistical problems such as multicollinearity.

All models have been estimated including appropriate statistical controls for demographic factors (such as gender, age within year group, ethnicity), socio-economic variables (mother's highest qualification level, family highest SES at KS2), individual behavioural problems in early childhood as reported in the early years parental interviews, and the quality of the early years HLE.

Reported here are selected statistical outputs given the large number of tables these analyses generated. These are reported as they are particular relevance to the analyses and are shown as, coefficients, associated standard errors, and effect sizes for the utilised neighbourhood measures.

Section 3.3.1: The impact of the neighbourhood on self-regulation

Taking into account demographic factors, socio-economic status, maternal educational qualifications, individual behavioural history and the quality of the early years home learning environment (HLE) there are statistically significant differences in students' 'self-regulation' scores at KS3 associated with an additional unit increase in the level of multiple deprivation of the residential neighbourhood (Table 3.3.1.1). The effect only emerges as significant on the imputed datasets, and at a lower probability level (p< .10).

TABLE 3.3.1.1 The influence of the IDACI on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood IDAC								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.878	***	0.766	0.36	6.259	***	0.569	0.46
Age within cohort	0.308	***	0.120	0.14	0.269	***	0.083	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	3.129		2.305	0.23	0.538		1.558	0.04
Black Caribbean heritage	0.294		2.283	0.02	0.242		1.582	0.02
Black African heritage	-4.134		2.880	-0.31	-1.580		1.996	-0.12
Any other ethnic minority	2.432		2.612	0.18	1.019		1.855	0.08
Indian heritage	7.335	**	2.931	0.54	4.784	**	1.888	0.35
Pakistani heritage	-1.480		2.127	-0.11	0.949		1.351	0.07
Bangladeshi heritage	9.096	**	4.464	0.67	5.440	**	2.628	0.40
Mixed race	-2.022		1.678	-0.15	-1.467		1.188	-0.11
Highest SES (KS2) Ref = Unemployed/Not working								
Unskilled	-0.139		2.781	-0.01	0.307		2.126	0.02
Semi-Skilled	-2.405		1.605	-0.18	-0.752		1.196	-0.06
Skilled Manual	1.663		1.417	0.12	1.404		0.997	0.10
Skilled, Non-Manual	4.977	***	1.370	0.37	4.459	***	0.931	0.33
Other Professional, Non-Manual	4.139	***	1.259	0.31	4.760	***	0.916	0.35
Professional, Non-Manual	6.084	***	1.720	0.45	6.754	***	1.260	0.50
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	1.674		2.963	0.12	3.069		2.281	0.23
Vocational	-2.078		1.353	-0.15	1.221		0.953	0.09
16 academic	1.130		1.138	0.08	2.293	***	0.801	0.17
18 academic	3.292	**	1.631	0.24	4.152	***	1.210	0.31
Degree or equivalent	5.240	***	1.584	0.39	6.229	***	1.167	0.46
Higher degree	6.658	***	2.190	0.49	7.434	***	1.707	0.55
Early Years Home Learning Environment Index (Continuous scale)	0.239	***	0.055	0.27	0.236	***	0.041	0.27
Neighbourhood: Income Deprivation Affecting Children (IDAC) Index	-2.688		2.093	-0.08	-2.910	*	1.495	-0.09
Intercept	88.421	***	1.861		86.544	***	1.278	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.072	***	2.019		5.869	***	1.124	
Variance (Level 1)	182.179	***	3.740		182.477	***	2.606	
Total Variance	192.251				188.346			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11394.30				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.052				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.92				12.75			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	37.07				63.85			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	14.64				16.43			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Higher criminality rates in the local area were related to lower levels of 'self-regulation' in Year 9, all other things being equal (ES= -0.12 original, ES=-0.11 imputed, Table 3.3.1.2). In contrast to the findings for previous neighbourhood related factors, the estimates reached statistical significance on both types of data.

TABLE 3.3.1.2: The influence of neighbourhood crime score on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Crime Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.879	***	0.765	0.36	6.246	***	0.569	0.46
Age within cohort	0.317	***	0.120	0.15	0.273	***	0.083	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	3.190		2.303	0.24	0.562		1.549	0.04
Black Caribbean heritage	0.344		2.266	0.03	0.229		1.572	0.02
Black African heritage	-3.974		2.874	-0.29	-1.520		1.972	-0.11
Any other ethnic minority	2.162		2.578	0.16	0.887		1.834	0.07
Indian heritage	7.478	**	2.930	0.55	4.866	**	1.892	0.36
Pakistani heritage	-1.430		2.124	-0.11	1.022		1.350	0.08
Bangladeshi heritage	9.330	**	4.464	0.69	5.572	**	2.631	0.41
Mixed race	-2.075		1.660	-0.15	-1.486		1.179	-0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.297		2.780	-0.02	0.175		2.127	0.01
Semi-Skilled	-2.438		1.604	-0.18	-0.762		1.194	-0.06
Skilled Manual	1.671		1.412	0.12	1.432		0.995	0.11
Skilled, Non-Manual	4.975	***	1.364	0.37	4.458	***	0.927	0.33
Other Professional, Non-Manual	4.174	***	1.248	0.31	4.797	***	0.913	0.36
Professional, Non-Manual	6.268	***	1.703	0.46	6.911	***	1.251	0.51
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	1.726		2.957	0.13	3.051		2.278	0.23
Vocational	-2.084		1.352	-0.15	1.249		0.953	0.09
16 academic	1.104		1.136	0.08	2.342	***	0.800	0.17
18 academic	3.218	**	1.631	0.24	4.198	***	1.206	0.31
Degree or equivalent	5.259	***	1.581	0.39	6.378	***	1.167	0.47
Higher degree	6.736	***	2.185	0.50	7.623	***	1.710	0.56
Early Years Home Learning Environment Index (Continuous scale)	0.240	***	0.055	0.27	0.237	***	0.041	0.27
Neighbourhood: Crime Score	-0.852	*	0.455	-0.12	-0.838	**	0.328	-0.11
Intercept	87.722	***	1.659		85.754	***	1.146	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.102	***	2.026		6.023	***	1.136	
Variance (Level 1)	181.905	***	3.737		182.171	***	2.604	
Total Variance	192.007				188.194			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11395.49				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.053				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	13.05				12.90			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	36.88				62.91			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	14.74				16.50			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

The incidence of limiting long-term illness in the students' neighbourhoods was also negatively associated with students' 'self-regulation' at the end of KS3, after allowing for socio-demographic influences, individual behavioural history, and the quality of the early years HLE. However, differences in 'self-regulation' scores corresponding to an additional unit increase in the Limiting Long Term Illness measure only attained statistical significance on the imputed data (ES=-0.09).

TABLE 3.3.1.3 The influence of the incidence of limiting long-term illness on self-regulation

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Limiting Long-Term Illness								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.848	***	0.767	0.36	6.239	***	0.569	0.46
Age within cohort	0.308	**	0.120	0.14	0.272	***	0.083	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	2.922		2.303	0.22	0.279		1.551	0.02
Black Caribbean heritage	-0.214		2.247	-0.02	-0.213		1.564	-0.02
Black African heritage	-4.602		2.857	-0.34	-2.143		1.971	-0.16
Any other ethnic minority	1.976		2.577	0.15	0.500		1.827	0.04
Indian heritage	7.113	**	2.925	0.53	4.569	**	1.888	0.34
Pakistani heritage	-1.822		2.123	-0.13	0.572		1.347	0.04
Bangladeshi heritage	8.748	**	4.457	0.65	4.850	*	2.618	0.36
Mixed race	-2.291		1.655	-0.17	-1.770		1.168	-0.13
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.187		2.781	-0.01	0.270		2.125	0.02
Semi-Skilled	-2.378		1.605	-0.18	-0.701		1.195	-0.05
Skilled Manual	1.818		1.411	0.13	1.505		0.993	0.11
Skilled, Non-Manual	5.143	***	1.361	0.38	4.586	***	0.922	0.34
Other Professional, Non-Manual	4.279	***	1.247	0.32	4.851	***	0.904	0.36
Professional, Non-Manual	6.262	***	1.707	0.46	6.835	***	1.248	0.51
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	1.847		2.958	0.14	3.282		2.276	0.24
Vocational	-2.123		1.354	-0.16	1.213		0.953	0.09
16 academic	1.100		1.140	0.08	2.312	***	0.801	0.17
18 academic	3.222	**	1.637	0.24	4.130	***	1.205	0.31
Degree or equivalent	5.090	***	1.600	0.38	6.118	***	1.175	0.45
Higher degree	6.452	***	2.212	0.48	7.168	***	1.713	0.53
Early Years Home Learning Environment Index (Continuous scale)	0.247	***	0.055	0.02	0.243	***	0.041	0.02
Neighbourhood: Percent People with Limiting Long-Term Illness	-0.071		0.062	-0.07	-0.095	**	0.043	-0.09
Intercept	88.733	***	2.057		87.243	***	1.441	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.204	***	2.017		5.964	***	1.122	
Variance (Level 1)	182.126	***	3.737		182.354	***	2.599	
Total Variance	192.331				188.318			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11401.66				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.053				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.95				12.81			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	36.24				63.27			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	14.60				16.44			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 3.3.2: The influence of the neighbourhood on pro-social behaviour

Students living in neighbourhood areas affected by high criminality rates displayed lower levels of 'pro-sociability' in Year 9, all other socio-demographic variables being held constant (Table 3.3.2.2).

The relatively modest effect (ES=-0.10) was only statistically significant on the imputed data. No other factors related to the neighbourhood tested showed any significant statistical association with levels of 'pro-social' behaviour in Year 9.

TABLE 3.3.2.2: The influence of the neighbourhood crime on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Crime Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.504	***	0.779	0.48	8.447	***	0.580	0.62
Age within cohort	0.189		0.121	0.09	0.181	**	0.087	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	2.046		2.337	0.15	0.210		1.502	0.02
Black Caribbean heritage	-0.714		2.306	-0.05	-0.942		1.603	-0.07
Black African heritage	-1.154		2.922	-0.08	-1.217		1.995	-0.09
Any other ethnic minority	0.184		2.623	0.01	-0.254		1.711	-0.02
Indian heritage	4.013		2.986	0.29	2.618		1.889	0.19
Pakistani heritage	-1.000		2.180	-0.07	-0.273		1.378	-0.02
Bangladeshi heritage	8.906	**	4.539	0.65	4.310		2.719	0.32
Mixed race	-2.056		1.685	-0.15	-1.477		1.228	-0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-1.316		2.816	-0.10	-0.769		2.205	-0.06
Semi-Skilled	-3.081	*	1.626	-0.23	-1.024		1.133	-0.08
Skilled Manual	1.283		1.432	0.09	1.490		0.983	0.11
Skilled, Non-Manual	3.038	**	1.383	0.22	3.046	***	0.923	0.22
Other Professional, Non-Manual	2.728	**	1.267	0.20	3.613	***	0.926	0.27
Professional, Non-Manual	4.439	**	1.729	0.33	4.908	***	1.254	0.36
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	-0.225		2.999	-0.02	0.966		2.304	0.07
Vocational	-2.840	**	1.373	-0.21	0.147		0.955	0.01
16 academic	1.611		1.153	0.12	2.121	***	0.778	0.16
18 academic	2.346		1.655	0.17	3.045	***	1.165	0.22
Degree or equivalent	4.091	**	1.606	0.30	4.940	***	1.107	0.36
Higher degree	4.627	**	2.222	0.34	5.053	***	1.689	0.37
Early Years Home Learning Environment Index (Continuous scale)	0.170	***	0.056	0.19	0.166	***	0.040	0.19
Neighbourhood: Crime Score	-0.541		0.467	-0.07	-0.764	**	0.332	-0.10
Intercept	90.107	***	1.688		88.025	***	1.175	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.440	***	2.399		7.631	***	1.202	
Variance (Level 1)	185.357	***	3.861		184.437	***	2.616	
Total Variance	198.797				192.068			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11437.45				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.068				0.040			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	10.90				12.19			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	23.72				50.91			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	11.90				14.86			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 3.3.3: The influence of the neighbourhood on hyperactivity

A positive linear association between the Index of Multiple Deprivation and students' levels of 'hyperactivity' in Year 9 was identified on the imputed data (ES=0.10). Although the estimate obtained on the original data has a similar magnitude and corresponding effect size, and points in the same direction, it is not statistically significant.

TABLE 3.3.3.1: The influence of neighbourhood IMD on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood IMD 2004 Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.132	***	0.776	-0.45	-7.478	***	0.535	-0.55
Age within cohort	-0.148		0.121	-0.07	-0.182	**	0.084	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-3.360		2.330	-0.25	-0.517		1.564	-0.04
Black Caribbean heritage	-0.028		2.316	-0.00	0.061		1.594	0.00
Black African heritage	4.765		2.906	0.35	1.620		1.984	0.12
Any other ethnic minority	-2.332		2.626	-0.17	-0.323		1.787	-0.02
Indian heritage	-6.240	**	2.986	-0.46	-4.944	**	1.934	-0.36
Pakistani heritage	0.575		2.201	0.04	-1.750		1.334	-0.13
Bangladeshi heritage	-11.718	***	4.531	-0.86	-7.052	***	2.654	-0.52
Mixed race	2.084		1.690	0.15	1.556		1.197	0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.264		2.804	0.09	1.169		2.146	0.09
Semi-Skilled	3.802	**	1.620	0.28	1.746		1.112	0.13
Skilled Manual	-1.696		1.430	-0.13	-1.499		0.988	-0.11
Skilled, Non-Manual	-3.826	***	1.381	-0.28	-3.449	***	0.975	-0.25
Other Professional, Non-Manual	-3.733	***	1.270	-0.28	-4.425	***	0.908	-0.33
Professional, Non-Manual	-4.347	**	1.733	-0.32	-5.157	***	1.242	-0.38
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	0.675		2.990	0.05	-2.573		2.252	-0.19
Vocational	1.944		1.368	0.14	-1.071		0.946	-0.08
16 academic	-0.707		1.151	-0.05	-2.039	***	0.787	-0.15
18 academic	-2.367		1.651	-0.17	-3.519	***	1.161	-0.26
Degree or equivalent	-4.153	***	1.605	-0.31	-5.388	***	1.146	-0.40
Higher degree	-5.324	**	2.222	-0.39	-6.028	***	1.644	-0.44
Early Years Home Learning Environment Index (Continuous scale)	-0.186	***	0.056	-0.21	-0.188	***	0.042	-0.21
Neighbourhood: Index of Multiple Deprivation (IMD) 2004 Score	0.032		0.024	0.09	0.035	**	0.017	0.10
Intercept	109.615	***	1.932		111.874	***	1.335	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	14.027	***	2.237		5.846	***	1.124	
Variance (Level 1)	183.531	***	3.777		185.264	***	2.607	
Total Variance	197.559				191.111			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11433.04				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.071				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.09				12.40			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	14.51				57.92			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	12.27				15.21			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Students' 'hyperactivity' scores at KS3 were positively related to the proportion of children aged under 16 who lived in low-income households in their neighbourhood measured by the IDACI (Table 3.3.3.2), according to the pooled estimates based on the imputed data (ES=0.12). Barring the absence of statistical significance, the estimates on the original data showed similar patterns of association.

TABLE 3.3.3.2: The influence of the neighbourhood IDACI on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood IDAC								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.123	***	0.776	-0.45	-7.469	***	0.535	-0.55
Age within cohort	-0.147		0.121	-0.07	-0.180	**	0.084	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-3.353		2.327	-0.25	-0.533		1.562	-0.04
Black Caribbean heritage	-0.126		2.313	-0.01	-0.011		1.592	-0.00
Black African heritage	4.554		2.914	0.34	1.364		1.992	0.10
Any other ethnic minority	-2.649		2.646	-0.20	-0.579		1.790	-0.04
Indian heritage	-6.140	**	2.975	-0.45	-4.878	**	1.928	-0.36
Pakistani heritage	0.758		2.177	0.06	-1.581		1.324	-0.12
Bangladeshi heritage	-11.614	**	4.519	-0.86	-7.149	***	2.651	-0.53
Mixed race	1.961		1.695	0.14	1.432		1.197	0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.163		2.803	0.09	1.144		2.145	0.08
Semi-Skilled	3.753	**	1.619	0.28	1.743		1.110	0.13
Skilled Manual	-1.655		1.430	-0.12	-1.462		0.988	-0.11
Skilled, Non-Manual	-3.759	***	1.383	-0.28	-3.372	***	0.974	-0.25
Other Professional, Non-Manual	-3.663	***	1.272	-0.27	-4.326	***	0.908	-0.32
Professional, Non-Manual	-4.229	**	1.738	-0.31	-5.023	***	1.242	-0.37
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	0.782		2.991	0.06	-2.459		2.251	-0.18
Vocational	1.907		1.367	0.14	-1.082		0.945	-0.08
16 academic	-0.727		1.148	-0.05	-2.037	***	0.787	-0.15
18 academic	-2.375		1.648	-0.18	-3.503	***	1.161	-0.26
Degree or equivalent	-4.163	***	1.602	-0.31	-5.353	***	1.146	-0.39
Higher degree	-5.351	**	2.217	-0.39	-6.041	***	1.640	-0.44
Early Years HLE Index (Continuous)	-0.184	***	0.056	-0.21	-0.187	***	0.042	-0.21
Neighbourhood: Income Deprivation Affecting Children (IDAC) Index	3.370		2.137	0.10	3.776	**	1.478	0.12
Intercept	109.495	***	1.886		111.719	***	1.294	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.912	***	2.230		5.749	***	1.119	
Variance (Level 1)	183.498	***	3.776		185.191	***	2.605	
Total Variance	197.410				190.940			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11423.30				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.070				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.11				12.44			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	15.21				58.62			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	12.33				15.28			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Employment also predicted students' 'hyperactivity' levels, a marginal (one-unit) increase in the index value being associated with approximately 6 points (40% of a standard deviation) higher 'hyperactivity' scores (ES=0.08). Again, despite broad similarity in the patterns of association on the original and imputed data, the large standard errors on the original data prevented the estimate from reaching statistical significance.

TABLE 3.3.3.3:The influence of employment on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Employment Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.132	***	0.776	-0.45	-7.476	***	0.535	-0.55
Age within cohort	-0.151		0.121	-0.07	-0.185	**	0.084	-0.09
Ethnicity: Ref = White UK heritage								
White European heritage	-3.262		2.326	-0.24	-0.403		1.559	-0.03
Black Caribbean heritage	0.125		2.300	0.01	0.264		1.595	0.02
Black African heritage	5.008	*	2.894	0.37	1.918		1.972	0.14
Any other ethnic minority	-2.208		2.617	-0.16	-0.139		1.777	-0.01
Indian heritage	-6.203	**	2.985	-0.46	-4.857	**	1.934	-0.36
Pakistani heritage	0.778		2.182	0.06	-1.543		1.328	-0.11
Bangladeshi heritage	-11.594	**	4.524	-0.86	-6.780	**	2.648	-0.50
Mixed race	2.185		1.680	0.16	1.719		1.189	0.13
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.190		2.803	0.09	1.093		2.146	0.08
Semi-Skilled	3.711	**	1.619	0.27	1.696		1.111	0.12
Skilled Manual	-1.765		1.426	-0.13	-1.558		0.986	-0.11
Skilled, Non-Manual	-3.869	***	1.379	-0.29	-3.520	***	0.974	-0.26
Other Professional, Non-Manual	-3.807	***	1.264	-0.28	-4.521	***	0.905	-0.33
Professional, Non-Manual	-4.388	**	1.730	-0.32	-5.249	***	1.240	-0.39
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	0.657		2.989	0.05	-2.637		2.251	-0.19
Vocational	1.959		1.368	0.14	-1.089		0.947	-0.08
16 academic	-0.712		1.151	-0.05	-2.061	***	0.788	-0.15
18 academic	-2.367		1.651	-0.17	-3.533	***	1.162	-0.26
Degree or equivalent	-4.117	**	1.608	-0.30	-5.387	***	1.149	-0.40
Higher degree	-5.296	**	2.225	-0.39	-5.985	***	1.641	-0.44
Early Years Home Learning Environment Index (Continuous scale)	-0.187	***	0.056	-0.21	-0.190	***	0.042	-0.21
Neighbourhood: Employment Score	6.448		5.089	0.08	6.051	*	3.492	0.08
Intercept	109.715	***	1.906		112.188	***	1.310	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	14.179	***	2.249		5.864	***	1.130	
Variance (Level 1)	183.444	***	3.777		185.349	***	2.610	
Total Variance	197.623				191.213			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11422.46				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.072				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.14				12.36			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	13.58				57.79			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	12.24				15.16			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Higher rates of criminality in the neighbourhoods of EPPSE students predicted higher levels of 'hyperactivity' in students (Table 3.3.3.3) on both original (ES=0.15) and imputed data (ES=0.14).

TABLE 3.3.3.4: The influence of neighbourhood crime score on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Crime Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.122	***	0.775	-0.45	-7.453	***	0.535	-0.55
Age within cohort	-0.158		0.121	-0.07	-0.184	**	0.084	-0.09
Ethnicity: Ref = White UK heritage								
White European heritage	-3.437		2.324	-0.25	-0.546		1.560	-0.04
Black Caribbean heritage	-0.219		2.295	-0.02	0.047		1.584	0.00
Black African heritage	4.318		2.907	0.32	1.339		1.986	0.10
Any other ethnic minority	-2.320		2.611	-0.17	-0.378		1.778	-0.03
Indian heritage	-6.336	**	2.973	-0.47	-4.961	**	1.927	-0.36
Pakistani heritage	0.678		2.172	0.05	-1.653		1.329	-0.12
Bangladeshi heritage	-11.948	***	4.517	-0.88	-7.279	***	2.661	-0.54
Mixed race	2.021		1.676	0.15	1.484		1.193	0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.363		2.800	0.10	1.301		2.145	0.10
Semi-Skilled	3.799	**	1.617	0.28	1.751		1.110	0.13
Skilled Manual	-1.660		1.425	-0.12	-1.509		0.988	-0.11
Skilled, Non-Manual	-3.746	***	1.376	-0.28	-3.391	***	0.976	-0.25
Other Professional, Non-Manual	-3.700	***	1.260	-0.27	-4.398	***	0.908	-0.32
Professional, Non-Manual	-4.456	***	1.720	-0.33	-5.246	***	1.235	-0.39
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	0.738		2.983	0.05	-2.463		2.249	-0.18
Vocational	1.914		1.365	0.14	-1.123		0.944	-0.08
16 academic	-0.689		1.147	-0.05	-2.108	***	0.785	-0.16
18 academic	-2.268		1.647	-0.17	-3.574	***	1.158	-0.26
Degree or equivalent	-4.174	***	1.598	-0.31	-5.548	***	1.144	-0.41
Higher degree	-5.434	**	2.211	-0.40	-6.282	***	1.643	-0.46
Early Years Home Learning Environment Index (Continuous scale)	-0.186	***	0.055	-0.21	-0.188	***	0.042	-0.21
Neighbourhood: Crime Score	1.124	**	0.466	0.15	1.015	***	0.322	0.14
Intercept	110.352	***	1.681		112.787	***	1.147	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.878	***	2.219		5.913	***	1.126	
Variance (Level 1)	183.061	***	3.765		184.845	***	2.601	
Total Variance	196.939				190.758			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11423.01				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.070				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.32				12.60			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	15.41				57.44			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	12.54				15.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 3.3.4: The influence of the neighbourhood on anti-social behaviour

Students in residential areas with higher concentrations of income-deprived children aged under 16 were on average rated as exhibiting higher levels of 'anti-social' behaviour (ES=0.10 imputed). A similar predicted difference associated with an additional unit increase in the IDAC Index value was found on the original data (and a similar corresponding effect size) but failed to reach statistically significant.

TABLE 3.3.4.1: The influence of neighbourhood IDACI on anti-social behaviour

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood IDAC								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.747	***	0.788	-0.34	-5.996	***	0.617	-0.43
Age within cohort	0.042		0.123	0.02	-0.073		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-2.640		2.366	-0.19	-0.471		1.597	-0.03
Black Caribbean heritage	0.332		2.348	0.02	0.513		1.637	0.04
Black African heritage	3.920		2.960	0.28	1.862		2.287	0.13
Any other ethnic minority	0.339		2.686	0.02	0.738		2.009	0.05
Indian heritage	-3.393		3.018	-0.25	-2.311		2.009	-0.16
Pakistani heritage	-0.700		2.201	-0.05	-1.206		1.393	-0.09
Bangladeshi heritage	-9.516	**	4.589	-0.69	-4.949	*	2.803	-0.35
Mixed race	2.734		1.723	0.20	1.561		1.435	0.11
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.820		2.851	0.06	2.418		2.254	0.17
Semi-Skilled	3.009	*	1.646	0.22	0.858		1.220	0.06
Skilled Manual	-1.896		1.454	-0.14	-1.772		1.094	-0.13
Skilled, Non-Manual	-3.546	**	1.406	-0.26	-3.344	***	1.040	-0.24
Other Professional, Non-Manual	-2.879	**	1.292	-0.21	-3.527	***	0.980	-0.25
Professional, Non-Manual	-3.954	**	1.766	-0.29	-4.467	***	1.291	-0.32
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	2.850		3.041	0.21	-0.363		2.394	-0.03
Vocational	2.268		1.389	0.16	-0.359		1.004	-0.03
16 academic	-1.114		1.167	-0.08	-1.958	**	0.867	-0.14
18 academic	-1.902		1.675	-0.14	-3.082	**	1.278	-0.22
Degree or equivalent	-4.346	***	1.627	-0.31	-5.222	***	1.216	-0.37
Higher degree	-4.708	**	2.251	-0.34	-5.340	***	1.720	-0.38
Early Years Home Learning Environment Index (Continuous scale)	-0.113	**	0.057	-0.13	-0.108	**	0.049	-0.12
Neighbourhood: Index of Deprivation Affecting Children (IDAC)	3.477		2.163	0.11	3.319	**	1.638	0.10
Intercept	106.801	***	1.914		108.735	***	1.404	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.811	***	2.307		6.365	***	1.345	
Variance (Level 1)	190.504	***	3.937		196.643	***	2.926	
Total Variance	203.315				203.009			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11467.82				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.063				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	9.96				7.86			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	6.76				46.71			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	9.77				9.92			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Controlling for other individual and family factors, including HLE, students living in areas with higher crime rates had higher scores for 'anti-social behaviour' in Year 9. The differences associated with a unit increase in the crime score were statistically significant on both the original (ES=0.12) and the imputed data (ES=0.10).

TABLE 3.3.4.2: The influence of neighbourhood crime on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Neighbourhood Crime Score								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.748	***	0.787	-0.34	-5.984	***	0.617	-0.43
Age within cohort	0.032		0.123	0.01	-0.077		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-2.659		2.365	-0.19	-0.453		1.594	-0.03
Black Caribbean heritage	0.413		2.331	0.03	0.625		1.641	0.04
Black African heritage	3.875		2.955	0.28	1.915		2.277	0.14
Any other ethnic minority	0.778		2.652	0.06	0.964		2.000	0.07
Indian heritage	-3.477		3.017	-0.25	-2.356		2.004	-0.17
Pakistani heritage	-0.692		2.197	-0.05	-1.230		1.391	-0.09
Bangladeshi heritage	-9.663	**	4.590	-0.70	-4.993	*	2.822	-0.36
Mixed race	2.895	*	1.705	0.21	1.657		1.424	0.12
Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.984		2.852	0.07	2.540		2.252	0.18
Semi-Skilled	3.035	*	1.646	0.22	0.859		1.224	0.06
Skilled Manual	-1.951		1.450	-0.14	-1.831	*	1.090	-0.13
Skilled, Non-Manual	-3.599	**	1.400	-0.26	-3.391	***	1.049	-0.24
Other Professional, Non-Manual	-2.985	**	1.281	-0.22	-3.625	***	0.978	-0.26
Professional, Non-Manual	-4.229	**	1.749	-0.31	-4.692	***	1.274	-0.33
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	2.731		3.035	0.20	-0.409		2.399	-0.03
Vocational	2.273		1.389	0.16	-0.399		1.004	-0.03
16 academic	-1.113		1.167	-0.08	-2.032	**	0.864	-0.14
18 academic	-1.856		1.675	-0.13	-3.160	**	1.276	-0.23
Degree or equivalent	-4.392	***	1.625	-0.32	-5.398	***	1.210	-0.38
Higher degree	-4.827	**	2.246	-0.35	-5.541	***	1.730	-0.40
Early Years Home Learning Environment Index (Continuous scale)	-0.117	**	0.056	-0.13	-0.111	**	0.049	-0.12
Neighbourhood: Crime Score	0.875	*	0.471	0.12	0.780	**	0.346	0.10
Intercept	107.817	***	1.707		109.737	***	1.323	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.590	***	2.271		6.342	***	1.326	
Variance (Level 1)	190.530	***	3.930		196.621	***	2.902	
Total Variance	203.120				202.962			
Number of Level-1 Observations	1419				2930			
Number of Level-2 Units	430				775			
Deviance (-2 x Log Restricted-Likelihood)	11469.98				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.062				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	9.95				7.87			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	8.37				46.91			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	9.86				9.94			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

SECTION 4: The influence of pre-school, primary and secondary school on social-behavioural outcomes in Year 9

The effectiveness of educational environments in shaping learners' outcomes is a topic of growing academic and policy interest, despite a lack of a consensus among researchers regarding which conceptual framework is most appropriate for investigating educational influences (Scheerens & Bosker, 1997).

The educational effectiveness research agenda has been largely driven by the desire to improve schools and the quality of teaching, and has had a strong focus on promoting greater equity in educational outcomes for disadvantaged groups (Scheerens & Bosker, 1997; Sammons, 1996; 1999; Teddlie & Reynolds, 2000; Creemers & Kyriakides, 2008, Teddlie & Sammons, 2010). In addition, in England some policy makers have argued that providing more information about school performance promotes more informed parental choice of schools, and that greater public accountability may incentivise schools to raise their educational standards (Goldstein & Leckie, 2009). But most importantly perhaps, it has been motivated by the widespread recognition among researchers and policymakers that educational systems potentially exert a substantial influence on the developmental trajectories of children and young adults over the long term, as well as on their prospects for academic and professional achievement, and their future economic well-being. There is therefore a need to promote school improvement especially for schools judged as weak or with poor student attainment (Sammons, 2008).

This section investigates the influence of educational environments in shaping students' social-behavioural outcomes at age 14 from the distant influence of the early years (pre-school), to more temporally proximate (primary schools) and contemporaneous influences (secondary schools).

Hierarchical multilevel modelling techniques employed in the previous section to test the influence of various potential predictors are used in this section. Additionally, hierarchical models which include cross-level interaction terms (Raudenbush & Byrk, 2010) consisting of a school-level and an individual-level predictor, are tested, to explore the interplay between background factors and educational environments, and to uncover differential effects of educational environments among various groups of students.

Section 4.1: The influence of pre-school on social behaviours in Year 9

Previous research has pointed to the importance of pre-school environments for children's social-behavioural development in the early years (Melhuish et al, 1990; Sammons et. al., 2003). This section expands this research to establish to what extent pre-schools, in addition to yielding short term benefits, such as providing a better start to primary school can also function as a long-term protective factor for when students' are older. It also investigates to what degree and in which ways these potential long-term influences are mediated by the quality of the home learning environment experienced in the early years.

In order to assess whether the impact of pre-school on students' social-behavioural outcomes continued to the end of KS3, several aspects of pre-school; exposure, duration, quality and effectiveness were analysed.

Exposure is related to whether a child had attended a pre-school or not and is a binary measure differentiating between 'home' children (Sammons et. al., 2003), i.e. children with minimal or no pre-school experience, and those who had attended a pre-school setting (regardless of type or quality) on a regular basis.

Duration captured the amount of time spent by the EPPSE child in a pre-school from start date to date of entry to reception in primary school (Sammons et. al., 2003, p. 19).

Pre-school quality was assessed using two observational scales recording various aspects of pre-school centre environments: the *Early Childhood Environmental Rating Scale–Revised Edition* (ECERS-R), an instrument developed by Harms, Clifford & Cryer (1998), and the *Early Childhood Environmental Rating Scale–Extension* (ECERS-E), developed for use on the EPPE (now EPPSE) project (Sylva et al., 2003; 2010).

The ECERS-R instrument consists of 43 items, grouped within 7 subscales which assess various characteristics of pre-school centre-based care and education: *Personal Care Routines* (e.g., greeting/departing, health and safety practices), *Space and Furnishings* (e.g., spatial arrangements for play, child-related display), *Language-Reasoning* (e.g., the use of language to develop reasoning skills), *Activities* (e.g., fine motor, dramatic play), *Interactions* (e.g., discipline, general supervision of children), *Program Structure* (e.g., schedule, free play, group time), and *Parents and Staff* (e.g., provisions for staff and parents, staff interaction and cooperation).

The ECERS-E observational scale assessed the quality of curricular provisions, as the ECERS-R instrument was considered as insufficiently sensitive to pedagogy facilitating children's development of intellectual and social competences (see Sylva et. al, 2006). ECERS-E consists of 18 items across 4 subscales: *Literacy* (e.g., adult reading with child), *Mathematics* (e.g., counting, concepts related to space and shape), *Science/Environment* (e.g., science resources), and *Diversity* (e.g., planning for individual needs, race and gender equality).

Both ECERS-R and ECERS-E use ranking scales which range from 1 to 7, with 1 indicating inadequate, and 7 denoting excellent provisions.

Pre-school academic effectiveness measures assessed academic progress from age 3 until reception class, as well as a number of social-behavioural dimensions including 'independence and concentration', 'peer sociability', 'co-operation and conformity', and 'anti-social behaviour'(Sammons et al., 2002a).

Results indicated that exposure to pre-schools (regardless of quality) did not predict students' scores on social-behavioural outcomes in Year 9 neither did the effectiveness of the pre-school attended. However, the quality of the pre-school centre as measured by the ECERS observational scales continued to operate as a significant predictor of better outcomes for some students for all four social behaviours at the end of KS3, both unconditionally and in combination with the quality of the home learning environment. Sections 4.1.1 to 4.1.4 provide a closer scrutiny of these results.

Section 4.1.1: The influence of pre-school on Self-Regulation

Both observational scales (ECERS-R and ECERS-E) were found to be significant predictors of students' 'self-regulation' scores in Year 9, although the original and imputed estimates differ slightly.

Taking account of differences in background factors and the early years HLE, students who had experienced a high quality pre-school (upper 20% on ECERS-R) showed significantly better 'self-regulation' at the end of KS3 compared to similar students who had attended low quality pre-school settings (bottom 20% of pre-schools in the sample). The magnitude of the average differences between these two categories of students is approximately 3.3 points on the original data (ES= 0.25), and 1.7 points on the imputed data (ES= 0.12).

TABLE 4.1.1.1: Contextualised Model: Influence of pre-school quality (ECERS-R) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-R Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	5.502	***	0.839	0.42	6.266	***	0.571	0.46
Age within cohort	0.216	*	0.131	0.10	0.278	***	0.083	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	1.873		2.513	0.14	0.348		1.531	0.03
Black Caribbean heritage	-1.924		2.923	-0.15	-0.125		1.544	-0.01
Black African heritage	-1.118		3.590	-0.09	-1.784		1.953	-0.13
Any other ethnic minority	1.890		3.356	0.14	0.641		1.824	0.05
Indian heritage	4.893		3.552	0.37	4.487	**	1.921	0.33
Pakistani heritage	-0.928		2.607	-0.07	1.299		1.410	0.10
Bangladeshi heritage	6.705		4.835	0.51	5.293	*	2.712	0.39
Mixed race	-1.364		1.820	-0.10	-1.764		1.159	-0.13
Number of Siblings: Ref = No Siblings								
1 Sibling	1.768		1.271	0.14	1.817	**	0.919	0.13
2 Siblings	0.971		1.415	0.07	1.200		0.989	0.09
3+ Siblings	0.361		1.660	0.03	0.017		1.192	0.00
Highest SES KS2: Ref Unempded/No wkg								
Unskilled	-0.237		3.168	-0.02	-0.201		2.150	-0.01
Semi-Skilled	-2.374		1.920	-0.18	-1.146		1.202	-0.08
Skilled Manual	-0.546		1.754	-0.04	0.956		1.065	0.07
Skilled, Non-Manual	4.332	***	1.660	0.33	4.014	***	0.970	0.30
Other Professional, Non-Manual	2.662	*	1.537	0.20	4.203	***	0.968	0.31
Professional, Non-Manual	4.336	**	1.940	0.33	5.997	***	1.303	0.44
Mother's Highest Qual E Yrs: Ref = None								
Other professional/ Misc.	1.784		3.249	0.14	3.095		2.264	0.23
Vocational	-1.611		1.597	-0.12	1.017		0.962	0.08
16 academic	1.298		1.378	0.10	2.193	***	0.808	0.16
18 academic	4.372	**	1.871	0.33	4.116	***	1.216	0.31
Degree or equivalent	5.552	***	1.767	0.42	6.225	***	1.173	0.46
Higher degree	8.012	***	2.339	0.61	7.468	***	1.700	0.55
Marital Status of Parent Ref = Married								
Single	-2.897	**	1.324	-0.22	-1.789	**	0.911	-0.13
Separated/Divorced	0.513		1.861	0.04	-1.229		1.265	-0.09
Living with partner	-1.841		1.310	-0.14	-2.420	***	0.890	-0.18
Widow/ widower	-2.260		4.363	-0.17	-0.818		2.703	-0.06
Early Years HLE (Continuous scale)	0.227	***	0.061	0.26	0.239	***	0.042	0.27
Pre-school Quality (ECERS-R): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	0.824		2.152	0.06	-0.507		1.200	-0.04
Medium Quality (Middle 60%)	0.940		1.232	0.07	0.386		0.838	0.03
High Quality (Highest 20%)	3.334	**	1.432	0.25	1.652	*	0.978	0.12
Intercept	87.076	***	2.656		85.163	***	1.767	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.443	***	2.251		5.294	***	1.067	
Variance (Level 1)	171.444	***	4.050		181.846	***	2.579	
Total Variance	179.886				187.140			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8914.92				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.047				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.05				13.05			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	47.25				67.39			
Proportion of Total Variance Reduct (%)	20.13				16.97			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.1.1.2: Contextualised Model: Influence of pre-school quality (ECERS-E) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-E Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	5.516	***	0.837	0.42	6.290	***	0.570	0.47
Age within cohort	0.201		0.131	0.10	0.280	***	0.083	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	1.734		2.481	0.13	0.169		1.542	0.01
Black Caribbean heritage	-2.074		2.938	-0.16	-0.529		1.566	-0.04
Black African heritage	-1.345		3.585	-0.10	-2.226		1.959	-0.16
Any other ethnic minority	1.371		3.368	0.10	0.011		1.822	0.00
Indian heritage	4.746		3.547	0.36	4.217	**	1.909	0.31
Pakistani heritage	-1.074		2.558	-0.08	1.006		1.414	0.07
Bangladeshi heritage	5.890		4.585	0.45	4.798	*	2.668	0.36
Mixed race	-1.383		1.820	-0.11	-1.889		1.166	-0.14
Highest SES KS2 Ref Unemplyd/No wkg								
Unskilled	-0.350		3.162	-0.03	-0.321		2.151	-0.02
Semi-Skilled	-2.091		1.911	-0.16	-1.107		1.214	-0.08
Skilled Manual	-0.330		1.748	-0.03	0.955		1.054	0.07
Skilled, Non-Manual	4.454	***	1.641	0.34	4.104	***	0.966	0.30
Other Professional, Non-Manual	2.804	*	1.512	0.21	4.263	***	0.969	0.32
Professional, Non-Manual	4.476	**	1.918	0.34	6.024	***	1.299	0.45
Mother's Highest Qual EYs Ref = None								
Other professional/ Misc.	1.750		3.242	0.13	3.387		2.266	0.25
Vocational	-1.600		1.587	-0.12	1.106		0.954	0.08
16 academic	1.470		1.373	0.11	2.321	***	0.804	0.17
18 academic	4.280	**	1.849	0.33	4.230	***	1.210	0.31
Degree or equivalent	5.583	***	1.758	0.43	6.295	***	1.169	0.47
Higher degree	7.749	***	2.330	0.59	7.446	***	1.697	0.55
Marital Status of Parent Ref = Married								
Single	-2.922	**	1.310	-0.22	-1.915	**	0.905	-0.14
Separated/Divorced	0.751		1.856	0.06	-1.194		1.263	-0.09
Living with partner	-1.924		1.305	-0.15	-2.532	***	0.893	-0.19
Widow/ widower	-2.161		4.359	-0.17	-0.556		2.732	-0.04
Early Years HLE (Continuous scale)	0.232	***	0.060	0.27	0.239	***	0.041	0.27
Pre-school Quality (ECERS-E): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	0.207		2.151	0.02	-0.386		1.219	-0.03
Medium Quality (Middle 60%)	0.534		1.222	0.04	0.635		0.845	0.05
High Quality (Highest 20%)	1.824		1.445	0.14	1.937	**	0.967	0.14
Intercept	88.558	***	2.293		86.069	***	1.440	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.034	***	2.277		5.453	***	1.072	
Variance (Level 1)	171.381	***	4.036		182.067	***	2.587	
Total Variance	180.415				187.519			
Number of Level-1 Observations	1130				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8959.03				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.050				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.08				12.95			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	43.56				66.42			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	19.89				16.80			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

The quality of the pre-school centre (ECERS-E) was a better predictor of students' 'self-regulation' in Year 9 than the ECERS-R scale on the imputed data. The differences in Year 9 teachers' ratings of 'self-regulation' between students who had attended high quality as opposed to low quality pre-school when they were young were around 1.9 points (ES = 0.14). A slightly stronger statistical association between 'self-regulation' and the ECERS-E scale could be expected as this measure predominantly relates to academic aspects of the pre-school experience. On the original data however the differences did not reach statistical significance.

These results show the net (or *unconditional)* pre-school quality influences, i.e. estimated differences in students' 'self-regulation' scores after the influence of background factors, as well as the HLE, are controlled for in the statistical models.

Earlier analyses have shown the effects of pre-school quality while controlling for early years HLE. The next set of analyses explores the combined effects of both pre-school and HLE together. The reference category in each analyses is the group of students who had a low early years HLE and no pre-school.

Results that model the impact of pre-school quality *conditional on* the quality of the early years HLE are summarised in Figure 4.1.1.1. Only effect sizes corresponding to differences between the reference category and the other combinations of HLE and pre-school quality are represented graphically (rather than the full set of estimated parameters) to illustrate the findings. The reference category represents students with no pre-school experience and HLEs of very low quality during the early years. Effect sizes that are statistically significant are highlighted in bold font, and displayed against a coloured bar.

FIGURE 4.1.1.1: Interaction effects between pre-school quality (ECERS-E) and early years HLE on self-regulation in Year 9

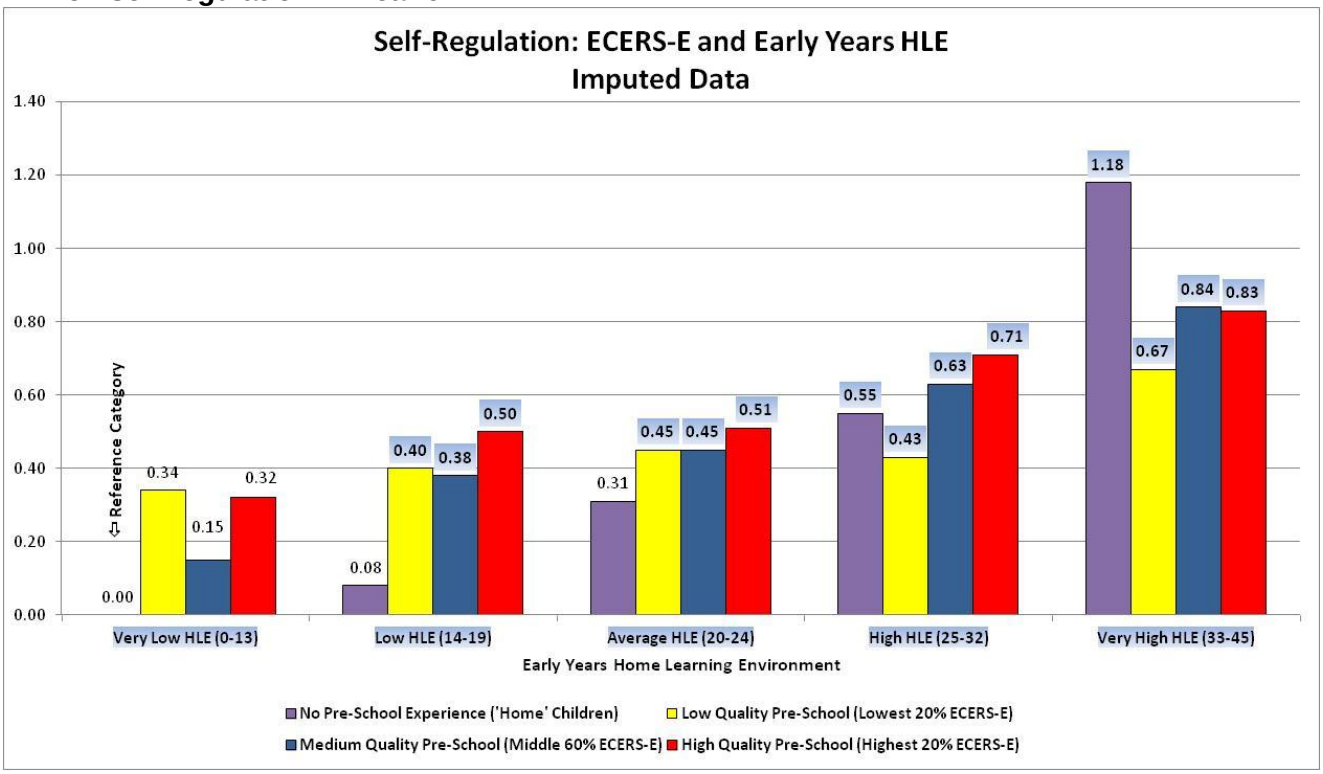


Figure 4.1.1.1 shows that the benefits of attending a high quality pre-school persist throughout KS3 depending on the early years HLE. For students who had a very low HLE (0 to 13) attending a pre-school, regardless of quality had little effect. However, for any measure of HLE above the very low, attending pre-school was beneficial. The very low HLE group contained a very small number of children which needs to be born in mind in this analysis.

As the early years HLE scores increase, the long-term impact of having attended a pre-school setting on later 'self-regulation' in KS3 becomes larger (rising from ES=0.50 to ES =0.83 for attending a high quality pre-school, and from ES=0.40 to ES=0.67 for attending a low quality pre-school). Generally for students with similar HLE scores, those who had attended high quality pre-school (top 20% on ECERS-E) show better 'self regulation' later on in KS3 compared to students from medium quality (middle 60%) and low quality (lowest 20%) centres.

Students with no pre-school experience (the 'home' sample), and from families with early years HLEs of very poor quality have the lowest 'self regulation scores' in Year 9. Students who had high HLEs and attended a high quality pre-school (upper 20%) derived enduring benefits from this protective combination of factors. Their 'self-regulation' scores in Year 9 were on average 11.3 points higher compared to those of students in the 'home' sample with very low quality early years HLE on the imputed data (ES = 0.83), amounting to the difference in 'self-regulation' scores between an average and a top 25 per cent student.

For students in the average and low quality HLE groups, those who had attended a low quality pre-school seemed to fare better in terms of 'self-regulation' in Year 9 compared to their counterparts who stayed at home. Therefore, a low quality pre-school may offer certain lasting benefits when parental engagement in activities stimulating the child's academic and behavioural development is very low. By contrast, those who had experienced high and very high quality early HLEs but who attended a low quality pre-school in the bottom 20 per cent showed relatively poorer 'self-regulation' by the end of KS3 compared to their counterparts who stayed at home (ES = 0.55 vs. ES=0.43 high quality early years HLE; ES= 1.18 vs. ES = 0.67 very high quality early years HLE). It should be noted, only 11 children (4.4%) in the 'home group' had very high early years HLE, and the corresponding large effect size estimate should therefore be treated very cautiously. A similar pattern, albeit less systematic, showed weaker associations for ECERS-R[16]. The results are not reported here for reasons of space.

Section 4.1.2: The influence of pre-school on pro-social behaviour

The ECERS-R measure of pre-school quality did not emerge as a statistically significant predictor of 'pro-social' behaviour in Year 9 on either the original or the imputed data.

[16] As with previous set of results, significant patterns emerge more consistently on the imputed data, as interaction effects require more computationally intensive procedures, which occasionally exceed the capabilities of the non-imputed data due to the large fraction of missing information.

TABLE 4.1.2.1: Contextualised Model: Influence of pre-school quality (ECERS-R) pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-R Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.764	***	0.852	0.51	8.461	***	0.587	0.62
Age within cohort	0.093		0.133	0.04	0.187	**	0.087	0.09
Ethnicity: Ref = White UK heritage								
White European heritage	0.197		2.544	0.02	0.049		1.489	0.00
Black Caribbean heritage	-3.718		2.972	-0.28	-1.266		1.554	-0.09
Black African heritage	1.012		3.652	0.08	-1.506		1.986	-0.11
Any other ethnic minority	0.557		3.403	0.04	-0.432		1.720	-0.03
Indian heritage	1.392		3.606	0.11	2.314		1.920	0.17
Pakistani heritage	-0.791		2.655	-0.06	0.013		1.439	0.00
Bangladeshi heritage	4.838		4.895	0.37	4.121		2.734	0.30
Mixed race	-1.713		1.844	-0.13	-1.748		1.218	-0.13
Number of Siblings: Ref = No Siblings								
1 Sibling	1.566		1.287	0.12	1.581	*	0.885	0.12
2 Siblings	0.920		1.432	0.07	0.770		0.973	0.06
3+ Siblings	0.242		1.681	0.02	-0.093		1.126	-0.01
Highest SESKS2Ref Unempyd/No wkg								
Unskilled	-2.275		3.201	-0.17	-1.068		2.206	-0.08
Semi-Skilled	-3.326	*	1.944	-0.25	-1.307		1.147	-0.10
Skilled Manual	-0.866		1.777	-0.07	1.118		1.049	0.08
Skilled, Non-Manual	2.707		1.680	0.21	2.723	***	0.990	0.20
Other Professional, Non-Manual	1.536		1.557	0.12	3.155	***	0.998	0.23
Professional, Non-Manual	2.859		1.965	0.22	4.172	***	1.350	0.31
Mother's Highest Qual (EYrs)Ref None								
Other professional/ Misc.	0.005		3.287	0.00	1.009		2.314	0.07
Vocational	-2.425		1.619	-0.18	-0.047		0.955	-0.00
16 academic	1.294		1.396	0.10	1.994	**	0.784	0.15
18 academic	2.683		1.896	0.20	3.003	**	1.166	0.22
Degree or equivalent	4.169	**	1.792	0.32	4.842	***	1.111	0.36
Higher degree	5.838	**	2.375	0.44	4.947	***	1.688	0.36
Marital Status of Parent Ref = Married								
Single	-1.864		1.341	-0.14	-1.356		0.943	-0.10
Separated/Divorced	-1.222		1.880	-0.09	-1.594		1.257	-0.12
Living with partner	-1.486		1.325	-0.11	-1.767	**	0.871	-0.13
Widow/ widower	1.115		4.421	0.08	-0.010		2.708	-0.00
Early Years HLE (Continuous scale)	0.178	***	0.062	0.21	0.166	***	0.041	0.19
Pre-school Quality (ECERS-R): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	1.178		2.189	0.09	-0.437		1.238	-0.03
Medium Quality (Middle 60%)	1.090		1.258	0.08	0.242		0.812	0.02
High Quality (Highest 20%)	2.398	~	1.466	0.18	1.393		0.958	0.10
Intercept	89.451	***	2.695		87.581	***	1.773	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.868	***	2.732		7.301	***	1.188	
Variance (Level 1)	172.909	***	4.164		184.245	***	2.631	
Total Variance	185.778				191.546			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Lhood)	8943.48				.			
VPC/ Intra-Class Correlation (ICC)	0.069				0.038			
Proportion of Level-1 Variance Red [Compared to Null Model] (%)	16.89				12.29			
Proportion of Level-2 Variance Red	26.97				53.03			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.67				15.09			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Note: ~ = Estimate approaching but failing to reach conventional levels of statistical significance (p= .102).

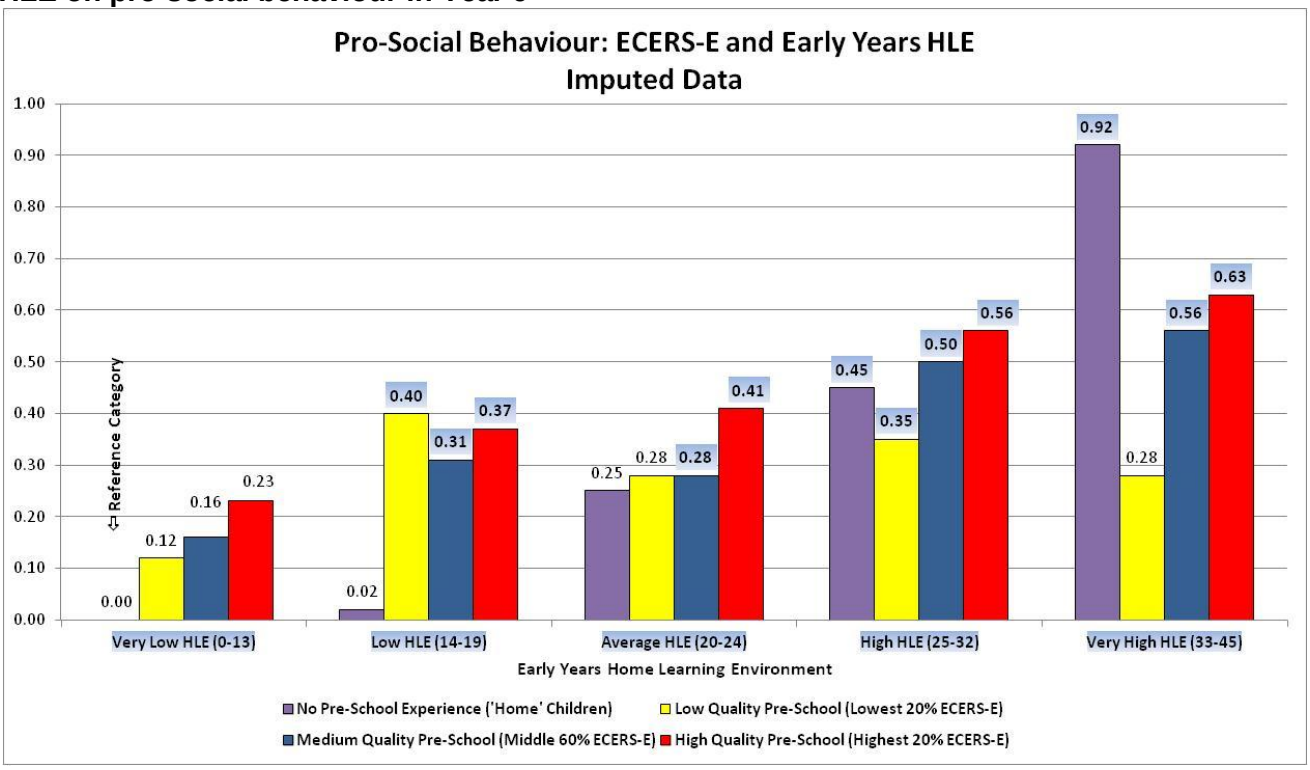
TABLE 4.1.2.2: Contextualise Model: Influence of pre-school quality (ECERS-E) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-E Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.823	***	0.848	0.52	8.485	***	0.585	0.62
Age within cohort	0.085		0.132	0.04	0.189	**	0.087	0.09
Ethnicity: Ref = White UK heritage								
White European heritage	0.074		2.504	0.01	-0.140		1.498	-0.01
Black Caribbean heritage	-4.125		2.977	-0.31	-1.702		1.573	-0.13
Black African heritage	0.610		3.635	0.05	-1.946		1.996	-0.14
Any other ethnic minority	-0.079		3.404	-0.01	-1.067		1.720	-0.08
Indian heritage	1.369		3.590	0.10	2.057		1.906	0.15
Pakistani heritage	-1.038		2.597	-0.08	-0.276		1.431	-0.02
Bangladeshi heritage	5.473		4.634	0.42	3.636		2.734	0.27
Mixed race	-1.909		1.839	-0.15	-1.890		1.224	-0.14
Highest SES KS2 Ref Unemplyd/No wkg								
Unskilled	-2.430		3.186	-0.19	-1.188		2.208	-0.09
Semi-Skilled	-3.186	*	1.929	-0.24	-1.282		1.146	-0.09
Skilled Manual	-0.770		1.766	-0.06	1.119		1.049	0.08
Skilled, Non-Manual	2.712		1.657	0.21	2.814	***	0.973	0.21
Other Professional, Non-Manual	1.564		1.527	0.12	3.222	***	0.985	0.24
Professional, Non-Manual	2.841		1.937	0.22	4.194	***	1.335	0.31
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	0.175		3.270	0.01	1.311		2.315	0.10
Vocational	-2.239		1.603	-0.17	0.040		0.953	0.00
16 academic	1.589		1.386	0.12	2.123	***	0.781	0.16
18 academic	2.823		1.867	0.22	3.104	***	1.164	0.23
Degree or equivalent	4.312	**	1.778	0.33	4.901	***	1.108	0.36
Higher degree	5.846	**	2.358	0.45	4.927	***	1.684	0.36
Marital Status of Parent Ref = Married								
Single	-1.930		1.323	-0.15	-1.453		0.929	-0.11
Separated/Divorced	-1.044		1.870	-0.08	-1.545		1.249	-0.11
Living with partner	-1.645		1.315	-0.13	-1.860	**	0.872	-0.14
Widow/ widower	1.242		4.404	0.09	0.236		2.705	0.02
Early Years HLE (Continuous scale)	0.175	***	0.061	0.20	0.166	***	0.041	0.19
Pre-school Quality (ECERS-E): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	1.173		2.186	0.09	-0.128		1.247	-0.01
Medium Quality (Middle 60%)	1.172		1.248	0.09	0.696		0.828	0.05
High Quality (Highest 20%)	2.469	*	1.475	0.19	1.943	**	0.965	0.14
Intercept	90.322	***	2.328		88.036	***	1.437	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.281	***	2.712		7.381	***	1.187	
Variance (Level 1)	171.922	***	4.120		184.374	***	2.641	
Total Variance	185.203				191.755			
Number of Level-1 Observations	1130				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8981.15				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.072				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.36				12.22			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	24.63				52.52			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.93				15.00			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

There were no significant effects of pre-school quality measured by ECERS-R on pro-social behaviour in Year 9. However, when the curricular version of the environmental rating scale (ECERS-E) was used, statistically significant differences between students who had attended a top 20 per cent pre-school and those who had attended a pre-school positioned in the lowest 20 per cent for quality were identified (ES=0.19 original; ES=0.14 imputed).

The relationship between the early years HLE and the quality of pre-school setting attended (or no pre-school for the home group) on later 'pro-social' behaviour was explored. The combined impact of these factors in shaping students' 'pro-social' behaviour at KS3 is shown in Figure 4.21.1.

FIGURE 4.2.1.1: Interaction effects between pre-school quality (ECERS-E) and early years HLE on pro-social behaviour in Year 9



As the quality of the early years HLE improved, there are additional benefits associated with attending high and medium quality pre-school settings. The differences between the 'home' group who had experienced only a low scoring HLE and those who attended a high quality pre-school (top 20% on ECERS-E) become progressively larger, with effect sizes ranging from ES= 0.37 for low quality HLE (HLE index 14-19), to ES= 0.63 when compared with HLEs of exceptionally high quality (HLE index 33-45). Similarly, effect sizes associated with medium quality pre-school centres (middle 60% of ECERS-E scores) increase from ES= 0.31 at low quality to ES= 0.56 at very high quality HLEs.

As noted previously, the very low number of very high HLE students is the home group (only 11) therefore, the large ES (0.92) for this group must be treated with caution.

The analyse demonstrates that the joint influence of pre-school quality and the early years HLE over the long run appears to be less important for 'pro-social' behaviour than for 'self-regulation'.

Section 4.1.3: The influence of pre-school on hyperactivity

The results on the original and imputed data show mixed evidence of the overall impact of pre-school quality on students' 'hyperactivity' levels in Year 9.

Table 4.1.3.1 indicates students who attended a high quality pre-school were rated 2.9 points lower on 'hyperactivity' (ES= -0.22 original) but the difference was not statistically significantly in the imputed data. For ECERS-E the imputed data shows significant differences between students who had had low quality and high quality, whereas this failed to reach significance on the original data. The joint effects of pre-school quality and the early years HLE as potential predictors of teachers' ratings of 'hyperactivity' in Year 9 were explored. Effect sizes corresponding to different combinations of predictor levels are displayed in Figure 4.1.3.1.

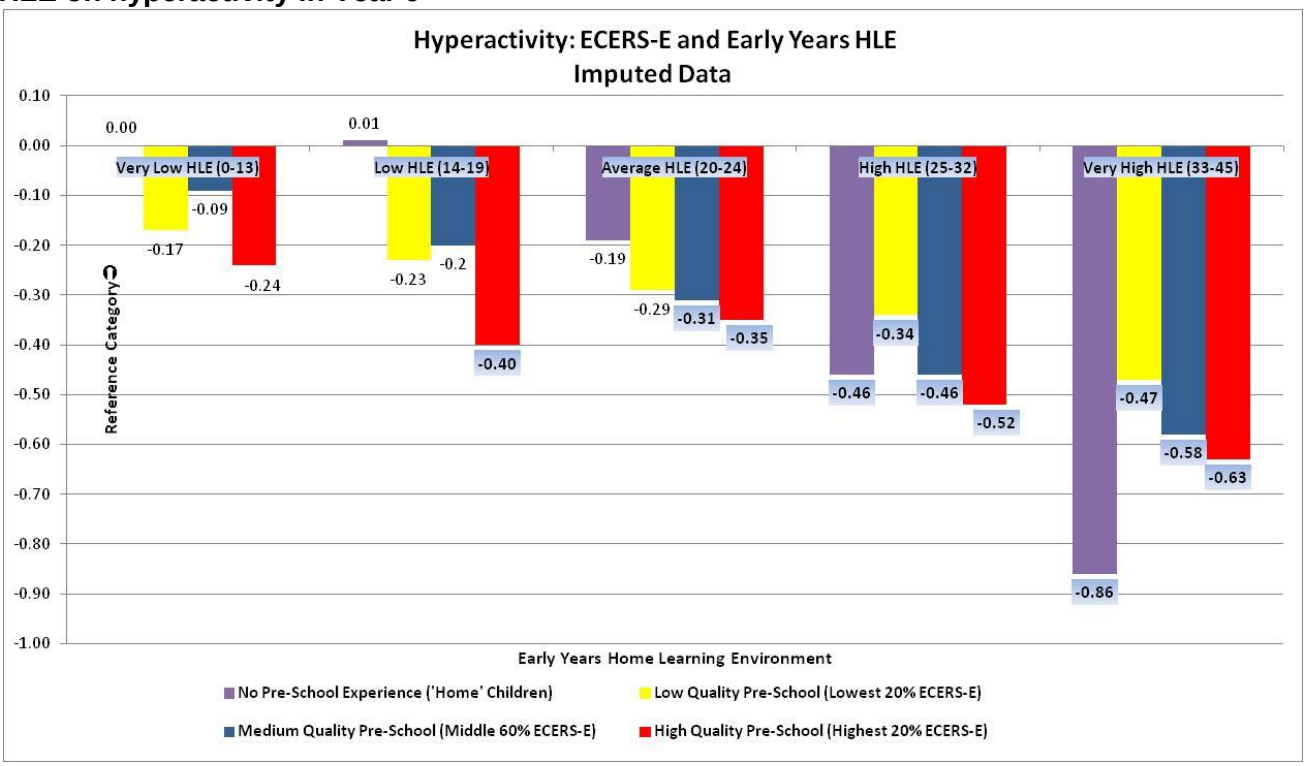
TABLE 4.1.3.1:Contextualised Model: Influence of pre-school quality (ECERS-R) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-R Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.807	***	0.837	-0.52	-7.503	***	0.533	-0.55
Age within cohort	-0.111		0.131	-0.05	-0.196	**	0.085	-0.09
Ethnicity: Ref = White UK heritage								
White European heritage	-1.486		2.513	-0.11	-0.304		1.529	-0.02
Black Caribbean heritage	1.692		2.918	0.13	0.223		1.514	0.02
Black African heritage	2.424		3.582	0.18	1.776		1.964	0.13
Any other ethnic minority	-0.709		3.353	-0.05	-0.224		1.790	-0.02
Indian heritage	-4.994		3.547	-0.38	-4.456	**	1.990	-0.33
Pakistani heritage	0.847		2.600	0.06	-1.558		1.383	-0.11
Bangladeshi heritage	-9.009	*	4.834	-0.69	-6.573	**	2.706	-0.48
Mixed race	1.214		1.819	0.09	1.847		1.185	0.14
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.148		1.270	-0.09	-2.119	**	0.897	-0.16
2 Siblings	-1.117		1.414	-0.09	-1.748	*	0.951	-0.13
3+ Siblings	1.231		1.660	0.09	0.040		1.103	0.00
Highest SES KS2 Ref Unempyd/No workig								
Unskilled	1.582		3.170	0.12	1.895		2.187	0.14
Semi-Skilled	4.784	**	1.920	0.36	2.379	**	1.114	0.18
Skilled Manual	2.205		1.753	0.17	-0.591		1.058	-0.04
Skilled, Non-Manual	-1.653		1.659	-0.13	-2.663	***	1.004	-0.20
Other Professional, Non-Manual	-0.491		1.536	-0.04	-3.422	***	0.958	-0.25
Professional, Non-Manual	-0.736		1.939	-0.06	-3.812	***	1.283	-0.28
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	1.159		3.249	0.09	-2.562		2.243	-0.19
Vocational	1.552		1.595	0.12	-0.905		0.950	-0.07
16 academic	-0.794		1.377	-0.06	-1.979	**	0.793	-0.15
18 academic	-2.462		1.869	-0.19	-3.547	***	1.166	-0.26
Degree or equivalent	-3.998	**	1.764	-0.30	-5.417	***	1.155	-0.40
Higher degree	-6.065	***	2.335	-0.46	-6.115	***	1.637	-0.45
Marital Status of Parent Ref = Married								
Single	4.935	***	1.323	0.38	2.836	***	0.921	0.21
Separated/Divorced	2.131		1.862	0.16	3.005	**	1.241	0.22
Living with partner	2.352	*	1.310	0.18	2.773	***	1.038	0.20
Widow/ widower	5.552		4.360	0.42	0.205		2.803	0.02
Early Years HLE (Continuous scale)	-0.178	***	0.061	-0.21	-0.190	***	0.042	-0.22
Pre-school Quality (ECERS-R): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	-0.352		2.147	-0.03	0.417		1.210	0.03
Medium Quality (Middle 60%)	-0.054		1.227	-0.00	0.301		0.822	0.02
High Quality (Highest 20%)	-2.875	**	1.424	-0.22	-1.433		0.946	-0.11
Intercept	107.675	***	2.652		112.636	***	1.763	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	6.727	***	2.060		4.857	***	1.053	
Variance (Level 1)	172.612	***	4.039		183.793	***	2.575	
Total Variance	179.339				188.650			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8913.89				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.038				0.026			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.32				13.10			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	59.00				65.04			
Proportion of Total Variance Reduction(%)	20.36				16.30			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.1.3.2: Contextualise Model: Influence of pre-school quality (ECERS-E) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-E Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.790	***	0.836	-0.52	-7.510	***	0.534	-0.55
Age within cohort	-0.093		0.131	-0.04	-0.196	**	0.085	-0.09
Ethnicity: Ref = White UK heritage								
White European heritage	-1.050		2.481	-0.08	-0.128		1.542	-0.01
Black Caribbean heritage	2.025		2.934	0.15	0.644		1.548	0.05
Black African heritage	2.609		3.579	0.20	2.183		1.953	0.16
Any other ethnic minority	-0.017		3.366	-0.00	0.498		1.777	0.04
Indian heritage	-4.476		3.544	-0.34	-4.074	**	1.972	-0.30
Pakistani heritage	1.324		2.552	0.10	-1.257		1.372	-0.09
Bangladeshi heritage	-8.482	*	4.582	-0.65	-5.967	**	2.676	-0.44
Mixed race	1.190		1.819	0.09	1.916		1.188	0.14
Highest SES KS2: Ref = Unemployed/Not working								
Unskilled	1.759		3.164	0.13	2.030		2.181	0.15
Semi-Skilled	4.390	**	1.911	0.33	2.318	**	1.119	0.17
Skilled Manual	1.955		1.747	0.15	-0.596		1.045	-0.04
Skilled, Non-Manual	-1.821		1.641	-0.14	-2.767	***	1.000	-0.20
Other Professional, Non-Manual	-0.762		1.511	-0.06	-3.458	***	0.955	-0.25
Professional, Non-Manual	-0.968		1.917	-0.07	-3.832	***	1.274	-0.28
Mother's Highest Qual (E Yrs): Ref = None								
Other professional/ Misc.	1.146		3.242	0.09	-2.883		2.248	-0.21
Vocational	1.408		1.586	0.11	-1.002		0.948	-0.07
16 academic	-0.967		1.373	-0.07	-2.114	***	0.790	-0.16
18 academic	-2.606		1.848	-0.20	-3.677	***	1.161	-0.27
Degree or equivalent	-4.052	**	1.757	-0.31	-5.525	***	1.154	-0.41
Higher degree	-5.977	**	2.327	-0.46	-6.123	***	1.641	-0.45
Marital Status of Parent Ref = Married								
Single	4.909	***	1.310	0.37	2.982	***	0.904	0.22
Separated/Divorced	1.820		1.857	0.14	2.972	**	1.250	0.22
Living with partner	2.561	**	1.305	0.20	2.917	***	1.051	0.21
Widow/ widower	5.158		4.357	0.39	-0.048		2.838	-0.00
Early Years HLE (Continuous scale)	-0.183	***	0.060	-0.21	-0.191	***	0.042	-0.22
Pre-school Quality (ECERS-E): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	-0.146		2.145	-0.01	0.079		1.204	0.01
Medium Quality (Middle 60%)	-0.284		1.216	-0.02	-0.359		0.801	-0.03
High Quality (Highest 20%)	-2.226		1.439	-0.17	-1.766	*	0.939	-0.13
Intercept	107.363	***	2.289		111.728	***	1.421	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.743	***	2.105		5.191	***	1.080	
Variance (Level 1)	172.274	***	4.019		184.264	***	2.581	
Total Variance	180.017				189.455			
Number of Level-1 Observations	1130				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8958.45				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.043				0.027			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.49				12.88			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	52.81				62.64			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.06				15.94			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

FIGURE 4.1.3.1: Interaction effects between pre-school quality (ECERS-E) and early years HLE on hyperactivity in Year 9



The protective influence from having attended a pre-school setting of medium and high quality increases proportionally with the quality of the early years HLE. However, only pre-schools classified in the upper 20 per cent of quality made a significant difference in reducing students' 'hyperactivity' over the long run. High quality pre-school reduces levels of 'hyperactivity' over the long term. However, it should be noted that students without pre-school experience (the home group) who experienced a very low/low quality early HLE showed much worse outcomes at age 14 in terms of raised 'hyperactivity' scores.

Section 4.1.4: The influence of pre-school on anti-social behaviour

Similar to the results for 'hyperactivity' the net effect of pre-school quality as measured by ECERS-R and ECERS-E was different for the original and imputed data for predicting 'anti-social behaviour' in Year 9. Coefficient estimates, as well as their corresponding standard errors and effect sizes, are given in Tables 4.1.4.1 - 4.1.4.2.

TABLE 4.1.4.1: Contextualised Model: Influence of pre-school quality (ECERS-R) on anti-social behaviour in Year 9

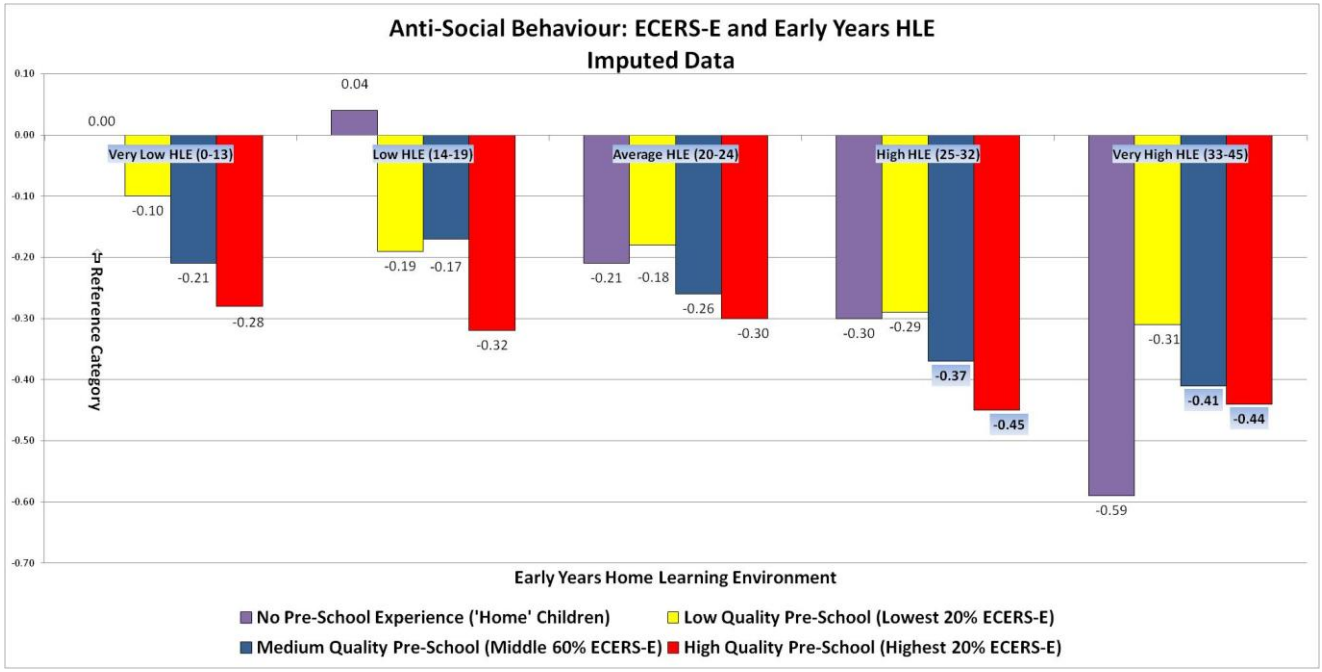
ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: ECERS-R Categorical								
FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	-4.724	***	0.825	-0.36	-6.021	***	0.613	-0.43
Age within cohort	0.030		0.130	0.01	-0.084		0.089	-0.04
Ethnicity: Ref = White UK heritage								
White European heritage	-1.399		2.485	-0.11	-0.237		1.572	-0.02
Black Caribbean heritage	1.739		2.876	0.13	0.842		1.583	0.06
Black African heritage	1.941		3.528	0.15	2.234		2.288	0.16
Any other ethnic minority	2.141		3.311	0.16	1.082		2.029	0.08
Indian heritage	-3.250		3.500	-0.25	-2.073		2.091	-0.15
Pakistani heritage	-0.685		2.559	-0.05	-1.648		1.519	-0.12
Bangladeshi heritage	-6.702		4.778	-0.51	-4.842	*	2.837	-0.35
Mixed race	1.830		1.796	0.14	1.994		1.426	0.14
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.502		1.255	-0.11	-1.704	*	0.925	-0.12
2 Siblings	-0.972		1.397	-0.07	-1.120		1.024	-0.08
3+ Siblings	1.320		1.640	0.10	0.581		1.253	0.04
Highest SES KS2RefUnempyd/No workg								
Unskilled	2.099		3.136	0.16	3.027		2.292	0.22
Semi-Skilled	3.817	**	1.897	0.29	1.352		1.221	0.10
Skilled Manual	2.378		1.731	0.18	-1.152		1.170	-0.08
Skilled, Non-Manual	-0.751		1.640	-0.06	-2.790	***	1.059	-0.20
Other Professional, Non-Manual	0.678		1.517	0.05	-2.802	***	1.015	-0.20
Professional, Non-Manual	-0.081		1.916	-0.01	-3.501	***	1.351	-0.25
Mother's Highest Qual (E Yrs)Ref None								
Other professional/ Misc.	2.713		3.212	0.21	-0.412		2.383	-0.03
Vocational	1.631		1.574	0.12	-0.155		1.016	-0.01
16 academic	-1.335		1.360	-0.10	-1.856	**	0.874	-0.13
18 academic	-2.357		1.846	-0.18	-3.090	**	1.294	-0.22
Degree or equivalent	-4.239	**	1.741	-0.32	-5.276	***	1.215	-0.38
Higher degree	-5.015	**	2.302	-0.38	-5.425	***	1.727	-0.39
Marital Status of Parent Ref = Married								
Single	4.096	***	1.307	0.31	2.176	**	1.008	0.16
Separated/Divorced	3.237	*	1.843	0.25	2.701	**	1.280	0.19
Living with partner	1.195		1.296	0.09	1.944	*	1.126	0.14
Widow/ widower	3.145		4.305	0.24	-1.504		2.969	-0.11
Early Years HLE (Continuous scale)	-0.116	*	0.060	-0.14	-0.108	**	0.050	-0.12
Pre-school Quality (ECERS-R): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	0.359		2.113	0.03	0.607		1.357	0.04
Medium Quality (Middle 60%)	-0.331		1.202	-0.03	-0.106		0.907	-0.01
High Quality (Highest 20%)	-2.383	*	1.394	-0.18	-1.613		1.041	-0.12
Intercept	104.930	***	2.615		109.647	***	1.868	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	3.954		1.931		5.870	***	1.296	
Variance (Level 1)	170.676	***	4.006		195.544	***	2.910	
Total Variance	174.630				201.414			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Lhood)	8887.71				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.023				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	19.34				8.37			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	71.22				50.86			
Proportion of Total Variance Reduct (%)	22.50				10.62			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.1.4.2:Contextualised Model: Influence of pre-school quality (ECERS-E) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]:ECERS-E Categorical								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.728	***	0.824	-0.36	-6.031	***	0.619	-0.43
Age within cohort	0.043		0.129	0.02	-0.084		0.089	-0.04
Ethnicity: Ref = White UK heritage								
White European heritage	-0.619		2.454	-0.05	-0.068		1.580	-0.00
Black Caribbean heritage	2.097		2.894	0.16	1.260		1.600	0.09
Black African heritage	2.376		3.527	0.18	2.723		2.257	0.19
Any other ethnic minority	2.799		3.325	0.21	1.797		2.000	0.13
Indian heritage	-2.789		3.499	-0.21	-1.708		2.063	-0.12
Pakistani heritage	0.123		2.512	0.01	-1.251		1.492	-0.09
Bangladeshi heritage	-6.886		4.527	-0.53	-4.169		2.827	-0.30
Mixed race	1.898		1.798	0.15	2.097		1.415	0.15
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	2.392		3.133	0.18	3.157		2.288	0.23
Semi-Skilled	3.481	*	1.889	0.27	1.285		1.237	0.09
Skilled Manual	2.258		1.726	0.17	-1.180		1.167	-0.08
Skilled, Non-Manual	-0.876		1.623	-0.07	-2.940	***	1.066	-0.21
Other Professional, Non-Manual	0.450		1.493	0.03	-2.905	***	1.017	-0.21
Professional, Non-Manual	-0.324		1.896	-0.02	-3.562	***	1.328	-0.25
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	2.607		3.208	0.20	-0.739		2.394	-0.05
Vocational	1.446		1.567	0.11	-0.264		1.011	-0.02
16 academic	-1.536		1.357	-0.12	-2.001	**	0.869	-0.14
18 academic	-2.484		1.827	-0.19	-3.218	**	1.284	-0.23
Degree or equivalent	-4.302	**	1.734	-0.33	-5.348	***	1.215	-0.38
Higher degree	-5.031	**	2.296	-0.39	-5.404	***	1.728	-0.39
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	4.197	***	1.295	0.32	2.263	**	0.998	0.16
Separated/Divorced	2.929		1.839	0.22	2.627	**	1.285	0.19
Living with partner	1.487		1.291	0.11	2.063	*	1.136	0.15
Widow/ widower	2.821		4.306	0.22	-1.819		3.010	-0.13
Early Years Home Learning Environment Index (Continuous scale)	-0.118	**	0.059	-0.14	-0.111	**	0.050	-0.12
Pre-school Quality (ECERS-E): Ref = Low Quality (Lowest 20%)								
No Quality (i.e. Home Children)	0.970		2.107	0.07	0.310		1.369	0.02
Medium Quality (Middle 60%)	-0.061		1.189	-0.00	-0.698		0.931	-0.05
High Quality (Highest 20%)	-1.668		1.408	-0.13	-1.931	*	1.043	-0.14
Intercept	104.024	***	2.253		109.219	***	1.535	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.767	*	1.963		6.047	***	1.303	
Variance (Level 1)	170.679	***	3.991		195.990	***	2.901	
Total Variance	175.447				202.037			
Number of Level-1 Observations	1130				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8933.63				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.027				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	19.33				8.16			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	65.31				49.38			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	22.14				10.35			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

For ‘anti-social’ behaviour the pattern of results was similar to those shown earlier, although the effect sizes were smaller. The extent to which ‘anti-social’ behaviour at Key Stage 3 hinges on past pre-school and early HLE influences is shown by effect sizes in Figure 4.1.4.1.

FIGURE 4.1.4.1:Interaction effects between pre-school quality (ECERS-E) and early years HLE on anti-social behaviour in Year 9



Consistent with previous research suggesting that ‘anti-social’ behaviour is not uncommon among adolescents (see Moffitt, 1993), the large majority of students are not statistically distinguishable from each other regardless of the particular combination of pre-school and HLE they experienced during the early years. Significant long-term differences in comparison to the reference group were is found for students who had experienced high or very high quality early years HLE and high or at least medium quality pre-school. These findings suggest that good quality pre-school combined with a stimulating HLE reduces ‘anti-social’ behaviour.

Section 4.2: The influence of primary school on social-behavioural outcomes in Year 9

After exploring the impact of various aspects related to pre-school quality and effectiveness, the influences of primary schools on social-behavioural outcomes in Year 9 were investigated.

During Key Stage 2, value-added indicators of primary school academic effectiveness were calculated using National Assessment data for all primary schools in England linking KS1 and KS2 results; separate indicators were calculated for the different curriculum subjects English, maths, and science (see Melhuish et al., 2006). The results in this section indicated that primary school academic effectiveness measures in the three curriculum subjects were not statistically significant predictors of social-behavioural outcomes in Year 9. These findings were consistent with those reported in at previous stages (see Sammons et al., 2007b; 2008b). They are in contrast to findings on EPPSE students’ academic attainment and progress in KS3 where primary school academic effectiveness still showed significant positive effects.

Section 4.3: The influence of secondary school academic effectiveness, school-level social composition and Ofsted judgments of quality on social-behavioural outcomes in Year 9

Two data sources, describe below, were used in order to explore the impact of secondary school effectiveness on social-behavioural outcomes in Year 9. Additionally, Department for Education (DfE) data sources were used to measure school-level aggregate social composition in terms of the percentage of students receiving FSM, percentage of students identified as having SEN, and the percentage of students of White British heritage.

A measure of secondary school academic effectiveness was based on of the Key Stage 2 to Key Stage 4 Contextual Value Added (KS2-KS4 CVA) school performance indicators[17], provided by the DfE for all mainstream schools, including academies and maintained special schools, but excluding independent schools.

The KS2-KS4 CVA measure captures the relative progress made by students from one education stage to the next by comparing each student's best eight GSCEs and equivalent outcomes against the typical performance of a student with similar background characteristics and with similar levels of prior attainment. Students' variation from the average GSCE results achieved by similar students was further aggregated to produce school averages. These school averages are subsequently adjusted to the number of students in the year group. Scores are then computed as numbers based around 1000: with scores above 1000 representing schools where students have made more progress relative to similar students nationally; and scores below 1000 indicating schools where students have shown less relative progress.[18]. For the purposes of this analyses, four-year school average (2006-2009) as an indicator of secondary school academic effectiveness across KS3 were used.

The other major data source used to provide indicators of school quality were the school inspection judgments made by The Office for Standards in Education, Children's Services and Skills (Ofsted)[19], a non-ministerial government department which carries out independent external evaluations of the educational system in England. Under Section 5 of the Education Act 2005, schools are required to be inspected at regular intervals. Ofsted has produced a framework for school inspections which sets out expectations, priorities, and grade descriptors for each judgment. After an inspection the school receives a report (based on the inspectors' judgements) which sets out the areas for improvement. The overarching goal of the inspection process is to promote the interests of children and young pupils and provide assurance that minimum standards are met by each school.

The scope of the Ofsted inspections is not confined to students' academic attainment, but also includes broader aspects about the quality of school provision, such as the wellbeing and development of learners, how 'at risk' students are encouraged to succeed, how students develop skills that will contribute to their future economic well-being, as well as school safety, leadership, and effective management of financial resources. The grading scale used for the judgments consists of four categories: Grade 1 (Outstanding), Grade 2 (Good), Grade 3 (Satisfactory), Grade 4 (Inadequate).

During the time EPPSE students were in KS3 there were seven main Ofsted judgments, which include the five outcomes from the 'Every Child Matters' [20] agenda, a government initiative launched in 2003, with the stated objective to ensure support in following areas: *Be healthy*, *Stay safe*, *Enjoy and achieve*, *Make a positive contribution*, and *Achieve economic well-being*. In addition to these five areas Ofsted judgments also assess the behaviour of students, as well as their spiritual, moral, and cultural development. An overall quality measure was devised, based on the judgments in specific areas (see Ofsted, 2011). Consequently, expert judgments produced by Ofsted provide

[17] See http://www.education.gov.uk/performancetables/schools_10/s3.shtml
[18] Further details on the computational algorithm for these CVA scores can be found in the 'Technical Guide to Contextual Value Added 2010 Model' publication, available online at http://www.education.gov.uk/performancetables/schools_10/cvacalc.pdf.
[19] For further information about OFSTED see http://www.ofsted.gov.uk/
[20] http://www.education.gov.uk/childrenandyoungpeople/sen/earlysupport/esinpractice/a0067409/every-child-matters

external indicators of a range of aspects which may influence students' social-behavioural development.

The Ofsted inspection data, from inspections conducted between 2005 and 2010 was collated. Where schools were inspected more than once during this time interval, the lowest rating was used, to ensure a sufficiently large sample of students who have attended secondary schools rated as 'satisfactory' or 'inadequate'.

A methodological complication was that for some schools (e.g., independent schools) no CVA scores were calculated by the DfE or Ofsted inspection judgments were unavailable while others fall outside Ofsted's jurisdiction. Such data are said to be *structurally missing* (as opposed to missing due to e.g., attrition) and the recommended practice among methodologists is to exclude affected variables from the multiple imputation process for substantive rationales. Given these limitations, the estimates produced on the multiply imputed data are based on a reduced sample size as data for students where there was no valid CVA scores or Ofsted inspection judgements was available were excluded from the analyses. Despite these difficulties analyses revealed significant secondary school influences on students' social-behavioural outcomes in KS3, as well as consistent evidence of a cross-level interplay between these influences and individual student background factors.

Measure of secondary school academic effectiveness (the four-year school average CVA score) did not predict students' social-behavioural outcomes in Year 9 to any significant extent. This measure only relates to academic attainment in GSCE subjects, so it may not have a straightforward bearing on social-behavioural development. Similarly, the school-level aggregate social composition as measured by the percent students who are FSM recipients, the percent students identified as SEN, and the percent students of White British heritage, was not significantly related to social-behavioural assessments by Year 9 teachers. This is in contrast to the findings on EPPSE students' academic outcomes (Sammons et al, 2011a) which were predicted by these factors.

Secondary school quality as judged by Ofsted inspectors significantly predicted social-behavioural outcomes at KS3. Inspectors' judgments of specific aspects related to the behaviour of learners, as well as to their development and well-being, showed statistically significant unconditional influences on social-behavioural outcomes, whereas the impact of the overall measure of school quality rated by inspectors was highly contingent on background factors.

Section 4.3.1: The impact of secondary school Ofsted judgments of quality on self-regulation

Secondary school quality related to the behaviour of learners (as measured by Ofsted judgments) predicted students' 'self-regulation' levels in Year 9.

Students attending secondary schools judged by Ofsted as 'outstanding', 'good', and 'satisfactory' were rated as significantly better for 'self-regulation' compared to students in secondary schools judged 'inadequate'.

Full results of the multilevel model assessing the impact of secondary school influences are reported in Table 4.3.1.1. The analyses controlled for student individual, family, and HLE influences. One of the ways schools improve students' academic outcomes that was identified in the educational effectiveness literature is through promoting better student behaviour, and these `findings are in line with this previous research evidence (Sammons, 2007b; Teddlie & Reynolds, 2000).

TABLE 4.3.1.1:Contextualised Model: Influence of secondary school quality (Ofsted behaviour of learners) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Ofsted Behaviour of Learners								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATa (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.913	***	0.845	0.36	6.087	***	0.621	0.44
Age within cohort	0.318	**	0.132	0.15	0.270	***	0.092	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	1.332		2.634	0.10	0.019		1.781	0.00
Black Caribbean heritage	-0.825		2.439	-0.06	-0.712		1.644	-0.05
Black African heritage	-4.584		3.170	-0.33	-3.103		2.195	-0.23
Any other ethnic minority	0.272		2.769	0.02	-0.214		2.036	-0.02
Indian heritage	6.834	**	3.050	0.50	3.517	*	2.014	0.26
Pakistani heritage	-1.746		2.256	-0.13	0.657		1.508	0.05
Bangladeshi heritage	7.838		5.078	0.57	6.407	**	3.096	0.47
Mixed race	-2.238		1.837	-0.16	-2.042		1.309	-0.15
Highest SES KS Ref Unempyd/No workg								
Unskilled	1.830		3.007	0.13	0.863		2.278	0.06
Semi-Skilled	-1.659		1.753	-0.12	-0.275		1.285	-0.02
Skilled Manual	2.475		1.510	0.18	1.890	*	1.055	0.14
Skilled, Non-Manual	6.655	***	1.458	0.48	5.576	***	0.993	0.41
Other Professional, Non-Manual	5.204	***	1.349	0.38	5.495	***	0.976	0.40
Professional, Non-Manual	7.803	***	2.010	0.57	8.263	***	1.430	0.60
Mother's Highest Qual (E Yrs) Ref = None								
Other professional/ Misc.	0.850		3.334	0.06	2.367		2.550	0.17
Vocational	-2.282		1.444	-0.17	0.997		1.032	0.07
16 academic	1.452		1.210	0.11	2.244	***	0.846	0.16
18 academic	3.184	*	1.775	0.23	3.779	***	1.339	0.28
Degree or equivalent	4.766	***	1.802	0.35	5.953	***	1.322	0.43
Higher degree	7.414	***	2.804	0.54	7.966	***	2.102	0.58
Early Years HLE (Continuous scale)	0.262	***	0.061	0.29	0.250	***	0.044	0.28
Ofsted Evaluation: Behaviour of Learners: Ref = Inadequate								
Ofsted Judgment: Outstanding	7.617	*	4.163	0.55	3.432		2.513	0.25
Ofsted Judgment: Good	7.293	*	4.079	0.53	2.509		2.406	0.18
Ofsted Judgment: Satisfactory	9.084	**	4.123	0.66	3.069		2.462	0.22
Intercept	78.367	***	4.439		82.340	***	2.716	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.836	***	2.072		6.414	***	1.251	
Variance (Level 1)	189.713	***	4.166		187.842	***	2.912	
Total Variance	198.548				194.256			
Number of Level-1 Observations	1207				2451			
Number of Level-2 Units	314				525			
Deviance (-2 x Log Restricted-Likelihood)	9707.33				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.045				0.033			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	9.32				10.18			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	44.80				60.49			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	11.84				13.81			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.3.1.2: Contextualised Model: Influence of secondary school quality (Ofsted development and well-being of learners) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Ofsted Development of Learners								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.710	***	0.845	0.34	5.973	***	0.617	0.44
Age within cohort	0.307	**	0.131	0.14	0.276	***	0.091	0.13
Ethnicity: Ref = White UK heritage								
White European heritage	2.116		2.594	0.15	0.334		1.749	0.02
Black Caribbean heritage	-0.008		2.379	-0.00	-0.409		1.625	-0.03
Black African heritage	-4.394		3.175	-0.32	-3.066		2.192	-0.22
Any other ethnic minority	0.415		2.772	0.03	-0.161		2.031	-0.01
Indian heritage	6.772	**	3.054	0.49	3.680	*	1.984	0.27
Pakistani heritage	-1.948		2.264	-0.14	0.607		1.503	0.04
Bangladeshi heritage	7.714		5.077	0.56	6.385	**	3.083	0.47
Mixed race	-2.482		1.824	-0.18	-2.265	*	1.297	-0.17
Highest SES KS2 Ref Unempd/No woking								
Unskilled	1.561		3.008	0.11	0.602		2.273	0.04
Semi-Skilled	-1.536		1.746	-0.11	-0.224		1.269	-0.02
Skilled Manual	2.503	*	1.507	0.18	1.943	*	1.051	0.14
Skilled, Non-Manual	6.599	***	1.455	0.48	5.479	***	0.985	0.40
Other Professional, Non-Manual	5.063	***	1.344	0.37	5.482	***	0.967	0.40
Professional, Non-Manual	7.627	***	2.007	0.55	8.026	***	1.427	0.59
Mother's Highest Qual (E Yrs) Ref = None								
Other professional/ Misc.	0.847		3.196	0.06	2.447		2.479	0.18
Vocational	-2.203		1.439	-0.16	1.099		1.018	0.08
16 academic	1.418		1.209	0.10	2.272	***	0.837	0.17
18 academic	3.130	*	1.765	0.23	3.898	***	1.324	0.28
Degree or equivalent	4.558	**	1.797	0.33	5.940	***	1.311	0.43
Higher degree	7.492	***	2.803	0.54	7.826	***	2.057	0.57
Early Years HLE (Continuous scale)	0.257	***	0.061	0.28	0.247	***	0.044	0.28
Ofsted Evaluation: Development and Well-Being of Learners: Ref = Inadequate								
Ofsted Judgment: Outstanding	8.246	**	4.131	0.60	3.036		2.417	0.22
Ofsted Judgment: Good	6.903	*	4.099	0.50	1.743		2.376	0.13
Ofsted Judgment: Satisfactory	9.249	**	4.148	0.67	3.155		2.415	0.23
Intercept	78.694	***	4.447		82.866	***	2.651	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.034	***	2.119		6.174	***	1.233	
Variance (Level 1)	189.608	***	4.162		187.265	***	2.881	
Total Variance	198.642				193.439			
Number of Level-1 Observations	1215				2482			
Number of Level-2 Units	317				527			
Deviance (-2 x Log Restricted-Likelihood)	9772.95				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.045				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	9.37				10.46			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	43.55				61.97			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	11.80				14.17			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

On the original data, the average predicted differences in 'self-regulation' (for students in secondary schools judged as 'inadequate') was 7.6 points for students in 'outstanding' schools (ES= 0.55), 7.3 points for students in 'good' secondary schools (ES= 0.53), and 9.0 points for students in secondary schools judged 'satisfactory' (ES=0.66), all other things being equal. In other words, students with similar background had 'self-regulation' scores that were lower by at least 1/2 of a standard deviation below the average if they attended a secondary school judged by Ofsted as 'inadequate' in terms of the behaviour of learners. The estimates produced on the imputed data, although reflecting a similar pattern of differences, were smaller in magnitude, and failed to reach statistical significance at conventional levels. It is difficult to evaluate to what extent this may be attributable to the methodological complications highlighted earlier in this section.

Significant average differences in 'self-regulation' scores between students attending secondary schools of unequal quality could also be identified when using Ofsted ratings of the extent to which schools promote the development and well-being of learners. These results are shown in Table 4.3.1.2.

Assuming identical background characteristics as well as similar early years HLE, students in secondary schools rated as 'outstanding' had higher 'self-regulation' by 8.2 points (ES= 0.60) compared to students in 'inadequate' schools. Students in secondary schools rated as 'good' had 6.9 higher scores (ES= 0.50), whereas students in 'satisfactory' schools had 9.2 higher scores (ES= 0.67) with respect to similar students in secondary schools with inadequate Ofsted ratings.

Similarly to the analyses conducted on the influence of pre-school quality, interaction effects between secondary school quality and students' background factors in shaping social-behavioural outcomes at KS3 were investigated.

Although the overall quality of secondary schools as judged by Ofsted did not appear to have an unconditional impact on 'self-regulation', further investigations revealed that the benefits that can be derived from high quality secondary education largely hinge on students' demographic and socio-economic backgrounds.

Table 4.3.1.3 shows the influence of the combined effect of secondary school quality and various risk factors (having a mother who was young, unmarried, with no qualifications or unemployed or in a family which provided low early years HLE) on 'self-regulation'.

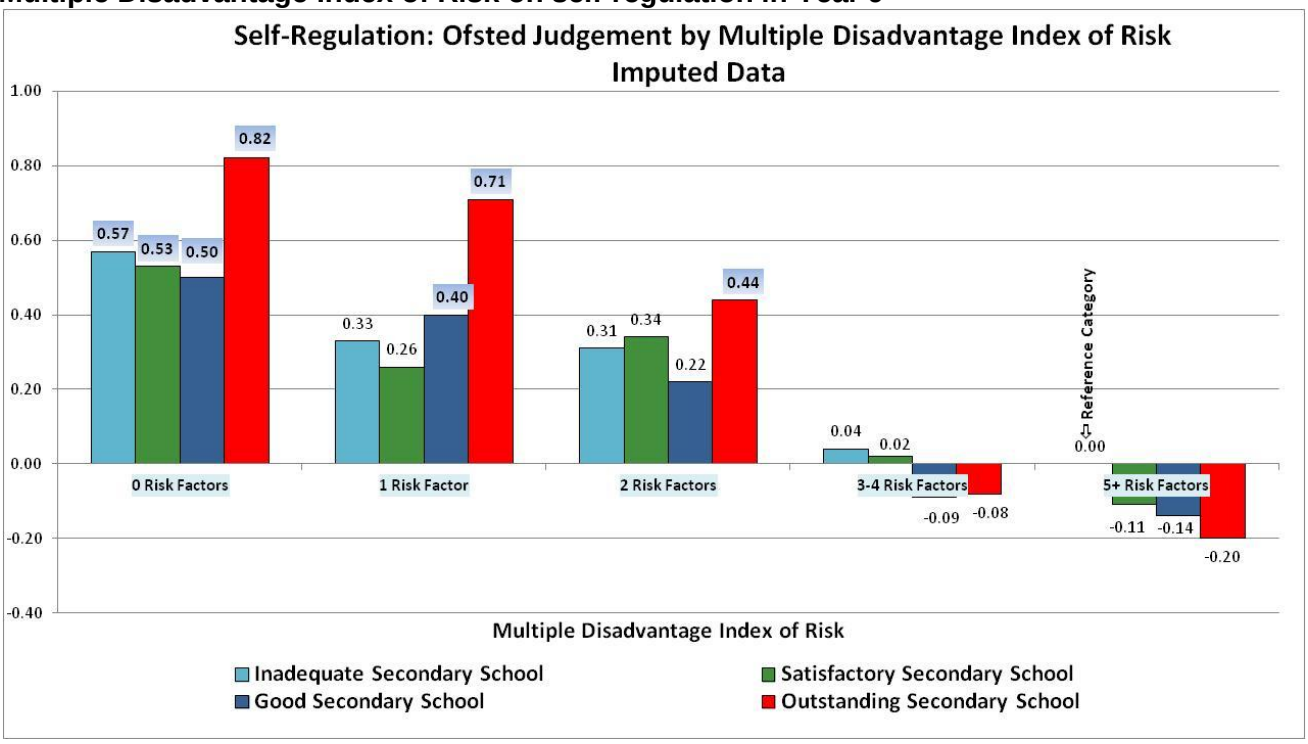
TABLE 4.3.1.3: Interaction effect - Secondary school quality (Ofsted overall judgment) and Multiple Disadvantage Index of Risk on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: INTERACTIONS: Ofsted by Number of Individual Risk Factors								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	5.222	***	0.952	0.38	6.069	***	0.621	0.43
Age within cohort	0.191		0.152	0.09	0.236	**	0.093	0.11
Ethnicity: Ref = White UK heritage								
White European heritage	4.259		3.132	0.31	1.340		1.757	0.10
Black Caribbean heritage	-0.849		3.377	-0.06	-0.387		1.618	-0.03
Black African heritage	-1.586		4.060	-0.11	-2.439		2.176	-0.17
Any other ethnic minority	-3.628		3.735	-0.26	0.383		2.080	0.03
Indian heritage	6.303		3.907	0.46	4.521	**	2.024	0.32
Pakistani heritage	-0.854		3.107	-0.06	0.436		1.562	0.03
Bangladeshi heritage	9.233		5.953	0.67	7.091	**	3.232	0.51
Mixed race	-1.636		2.083	-0.12	-2.105		1.337	-0.15
Number of Siblings: Ref = No Siblings								
1 Sibling	0.476		1.448	0.03	1.531		1.021	0.11
2 Siblings	-0.061		1.610	-0.00	1.222		1.109	0.09
3+ Siblings	-0.152		1.875	-0.01	-0.399		1.361	-0.03
Behavioural History Ref No Behavioural Probs								
1 Behavioural Problem	-2.894	*	1.542	-0.21	-3.905	***	1.058	-0.28
2+ Behavioural Problems	-5.846		3.637	-0.42	-2.883		2.249	-0.21
Interaction Effects: Ofsted Evaluation of Secondary School by Number of Risk Factors: Ref= Inadequate Secondary School, 5+ Risk Factors								
Outstanding Secondary School, No Risk Factor	5.736		6.900	0.42	11.496	***	3.636	0.82
Outstanding Secondary School, 1 Risk Factor	5.816		6.939	0.42	9.882	***	3.573	0.71
Outstanding Secondary School, 2 Risk Factors	-2.328		7.151	-0.17	6.127	*	3.701	0.44
Outstanding Secondary School, 3-4 Risk Factors	-5.931		7.236	-0.43	-1.063		3.747	-0.08
Outstanding Secondary School, 5+ Risk Factors	-1.209		10.397	-0.09	-2.758		5.363	-0.20
Good Secondary School, No Risk Factor	2.471		6.714	0.18	7.008	**	3.277	0.50
Good Secondary School, 1 Risk Factor	0.088		6.694	0.01	5.570	*	3.272	0.40
Good Secondary School, 2 Risk Factors	-0.478		6.727	-0.03	3.124		3.327	0.22
Good Secondary School, 3-4 Risk Factors	-7.493		6.779	-0.54	-1.199		3.369	-0.09
Good Secondary School, 5+ Risk Factors	-9.398		7.269	-0.68	-1.901		3.516	-0.14
Satisfactory Secondary School, No Risk Factor	2.769		6.867	0.20	7.466	**	3.479	0.53
Satisfactory Secondary School, 1 Risk Factor	-1.623		6.801	-0.12	3.605		3.422	0.26
Satisfactory Secondary School, 2 Risk Factors	-0.309		6.771	-0.02	4.809		3.445	0.34
Satisfactory Secondary School, 3-4 Risk Factors	-2.665		6.804	-0.19	0.266		3.307	0.02
Satisfactory Secondary School, 5+ Risk Factors	-7.627		7.290	-0.55	-1.558		3.903	-0.11
Inadequate Secondary School, No Risk Factor	3.883		7.368	0.28	7.926	**	4.000	0.57
Inadequate Secondary School, 1 Risk Factor	0.868		7.361	0.06	4.597		3.549	0.33
Inadequate Secondary School, 2 Risk Factors	-0.257		7.153	-0.02	4.376		3.560	0.31
Inadequate Secondary School, 3-4 Risk Factors	-2.152		7.101	-0.16	0.541		3.552	0.04
Intercept	98.526	***	6.722		92.226	***	3.329	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.845	***	2.708		7.048	***	1.313	
Variance (Level 1)	191.002	***	4.886		194.873	***	3.019	
Total Variance	199.847				201.921			
Number of Level-1 Observations	949				2482			
Number of Level-2 Units	272				527			
Deviance (-2 x Log Restricted-Likelihood)	7556.80				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.044				0.035			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	8.70				6.82			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	44.74				56.59			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	11.26				10.41			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Taking account of demographic factors and individual behavioural history, a student in a secondary school judged 'outstanding' by Ofsted who had no 'risks' in early childhood, was rated approximately 11.5 points higher (ES= 0.82) compared to a student in an 'inadequate' school who had five or more

'risks'. This difference is sufficient to move a student with otherwise average 'self-regulation' abilities to the top 25th percentile in the EPPSE sample. The differences in expected 'self-regulation' scores among students attending different types of secondary schools (in terms of overall quality), with different degree of socio-economic risk exposure, are further illustrated in Figure 4.3.1.1.

FIGURE 4.3.1.1: Interaction between secondary school quality (Ofsted overall judgement) and Multiple Disadvantage Index of Risk on self-regulation in Year 9



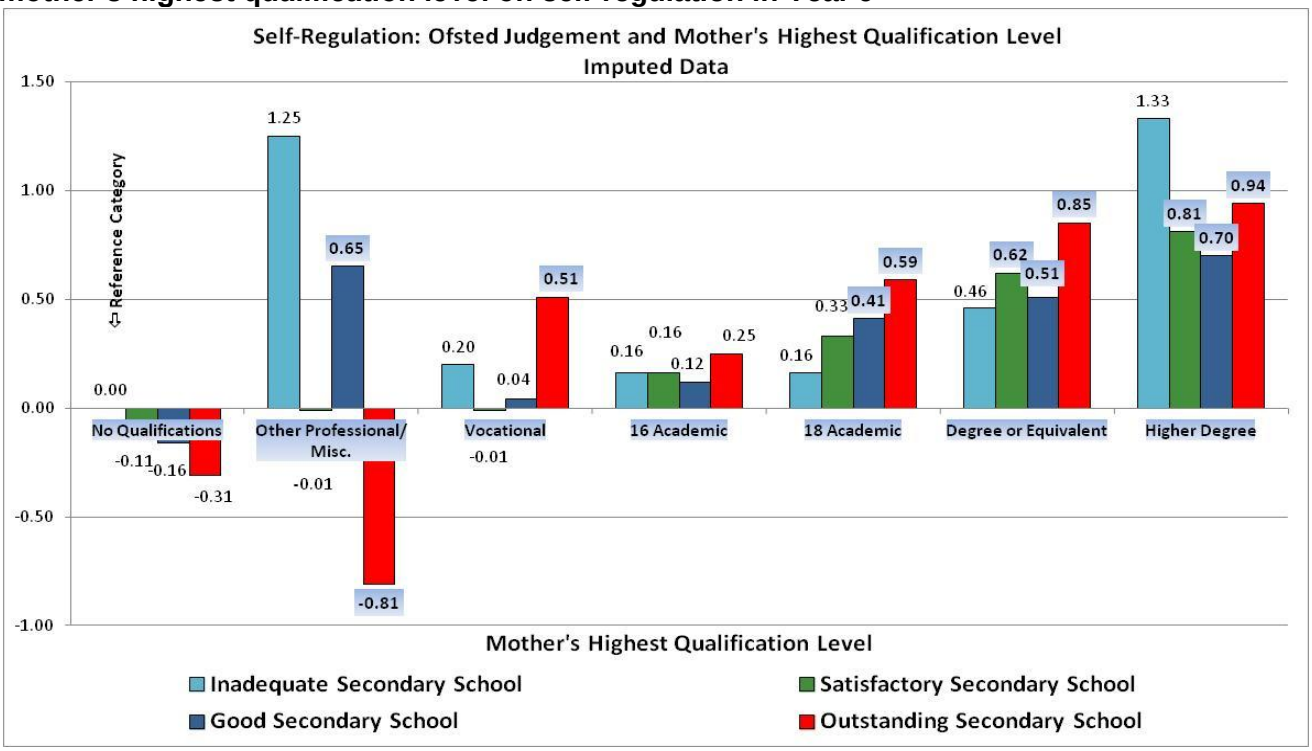
Students who had no 'risk' factors during their early years had better 'self-regulation' at the end of KS3 compared to those with high levels of risk exposure attending 'inadequate' secondary schools, regardless of the quality of the attended secondary schools.

Students with no 'risk' factors and who attended 'outstanding' secondary schools showed significantly better 'self-regulation' (ES =0.82). Students in school rated lower than 'outstanding' (no risk factors) showed similar levels of 'self-regulation' (ranging between ES=0.50 and ES=0.57).

Students with low risk have significantly more resilient to less favourable educational influences, e.g., in lower quality and inadequate secondary schools. In the presence of one 'risk factor', only students in 'good' or 'outstanding' secondary schools were significantly different from highly at risk (5+ risk factors) students in inadequate schools.

Further, results seem to indicate that the impact of two socio-economic risk factors can only be significantly mitigated by attending a high quality secondary school (rated as 'outstanding').
Finally, if three or more risk factors have been present in the early childhood, students will tend, on average, to exhibit very low self-regulation abilities, irrespective of secondary school quality measured by Ofsted ratings.

FIGURE 4.3.1.2: Interaction between secondary school quality (Ofsted overall judgement) and mother's highest qualification level on self-regulation in Year 9



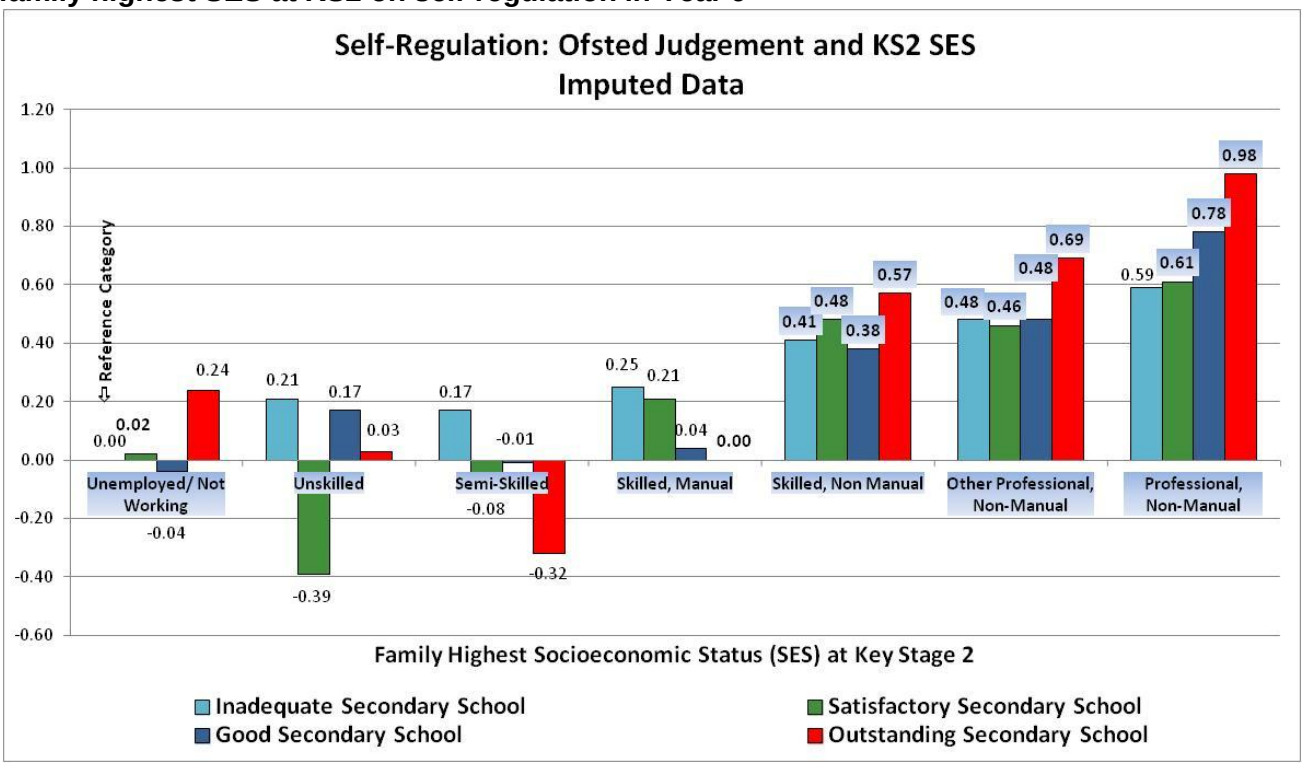
Students in high quality secondary schools had better 'self regulation' where they also had a mother's with the highest qualifications levels.

Students of mothers holding a degree or equivalent, or a higher degree and who attended secondary schools judged by Ofsted as 'outstanding' had the highest levels of 'self-regulation' (ES= 0.85, and ES=0.94, respectively).

Students who had attended 'good' and 'satisfactory' secondary schools also had better 'self-regulation compared to students of mothers with no educational qualifications attending 'inadequate' schools. For those whose mothers holding intermediate qualifications (18 years academic) significant differences with respect to the reference group were only noticeable if their children had attended 'good' or 'outstanding' secondary schools[21].

[21] It should be noted that the large negative ES=-0.81 for students whose mothers are in the miscellaneous category for qualification level and who attend an 'outstanding' school, is likely to be an anomaly because it is based on a very low number of students.

FIGURE 4.3.1.3: Interaction between secondary school quality (Ofsted overall judgement) and family highest SES at KS2 on self-regulation in Year 9



Family highest socio-economic status (SES) at KS2 also operated as a strong moderator of secondary school influences. Students from higher SES families had significantly better 'self-regulation' compared to students of unemployed parents who attended an 'inadequate' school. These high SES students have higher 'self-regulation' than low SES students who attended an 'outstanding' school.

The largest benefits from attending secondary schools of outstanding quality were for students from families whose highest socio-economic status as KS2 was professional non-manual (ES = 0.98).

Students of unskilled, skilled manual and skilled non-manual parents were not significantly different in terms of 'self-regulation' from students of unemployed parents in inadequate schools, regardless of the quality of the secondary school attended. Consequently, the equity gap is also evident in the extent to which students from different socio-economic backgrounds can make the most out of the educational opportunities that they encountered at school.

Section 4.3.2: The influence of secondary school academic Ofsted judgments of quality on pro-social behaviour

In line with the results found for 'self-regulation', a significant differential impact of secondary school quality in behavioural outcomes was found in teachers' assessments of students' pro-social behaviour at the end of KS3. The magnitude of the differences between students in secondary schools deemed as 'inadequate' in Ofsted judgments, and students in satisfactory, good, and outstanding schools, net of demographic, socio-economic, and HLE can be seen in Table 4.3.2.1.

The predicted differences in 'pro-social' behaviour scores for students in 'outstanding' and 'satisfactory' schools (in comparison with those in inadequate schools) amount, all other things equal, to approximately 8.6 points (ES = 0.63 in both cases), and 7.7 points for students in 'good' secondary schools.

Further, students in secondary schools who had received better assessments in the area of development and well-being of learners also tended to show higher levels of peer empathy and volunteerism.

The social competence of students in outstanding secondary schools was rated on average 9.3 points (or 62% of a standard deviation from the sample mean) higher compared to that of students in inadequate schools, all else being equal (ES= 0.67). Students in good secondary schools were assigned 7.1 points higher average scores, whereas students in satisfactory schools received 8.8 points higher average scores, net of background influences.

These significant differences among students in terms of 'self-regulation' and 'pro-social behaviour', contingent on school quality measured by Ofsted show that higher quality schools benefit both students' academic and their social-behavioural outcomes in KS3.

The overall quality measure was, as in the case of 'self-regulation, related to pro-social behaviour in a conditional manner, depending on the socio-economic circumstances surrounding the early childhood stage. The magnitude of the predicted conditional differences is shown in Table 4.3.2.3.

Although these differences are weaker than in the case of 'self-regulation', they nonetheless indicate that socio-economic risk significantly impacts 'pro-social' abilities, even in the context of educational settings of 'outstanding' quality. Thus, among students in outstanding secondary schools, only those who were exposed to no more than two risk factors were rated as having significantly better 'pro-social' abilities compared to highly at risk students in inadequate schools (between 6.3 and 9.3 points higher, depending on the number of risk factors, corresponding to effect sizes of 0.46, and 0.69, respectively). When the level of socio-economic risk exceeded this threshold, their 'pro-social' behaviour scores were no longer statistically significant from those of the highly disadvantaged students attending inadequate secondary schools.

TABLE 4.3.2.1: Contextualised Model: Influence of secondary school Quality (Ofsted inspection judgment, Behaviour of learners) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Ofsted Behaviour of Learners								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.426	***	0.852	0.47	8.372	***	0.633	0.61
Age within cohort	0.197		0.133	0.09	0.175	*	0.095	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	0.072		2.648	0.01	-0.448		1.789	-0.03
Black Caribbean heritage	-2.201		2.463	-0.16	-2.059		1.695	-0.15
Black African heritage	-1.216		3.195	-0.09	-2.586		2.194	-0.19
Any other ethnic minority	-0.890		2.796	-0.06	-0.978		1.915	-0.07
Indian heritage	3.021		3.085	0.22	1.357		2.037	0.10
Pakistani heritage	-1.757		2.302	-0.13	-0.898		1.509	-0.07
Bangladeshi heritage	10.631	**	5.122	0.77	5.971	*	3.302	0.43
Mixed race	-2.511		1.849	-0.18	-2.551	*	1.347	-0.19
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.424		3.017	-0.03	-0.909		2.304	-0.07
Semi-Skilled	-2.594		1.761	-0.19	-0.961		1.263	-0.07
Skilled Manual	1.795		1.519	0.13	1.747	*	1.053	0.13
Skilled, Non-Manual	4.723	***	1.466	0.34	4.076	***	1.007	0.30
Other Professional, Non-Manual	3.318	**	1.358	0.24	3.970	***	0.985	0.29
Professional, Non-Manual	5.435	***	2.022	0.39	5.816	***	1.457	0.42
Mother's Highest Qualifications Early Yrs: Ref = None								
Other professional/ Misc.	-1.951		3.350	-0.14	-0.355		2.535	-0.03
Vocational	-3.062	**	1.452	-0.22	-0.104		1.030	-0.01
16 academic	1.751		1.217	0.13	2.013	**	0.826	0.15
18 academic	1.902		1.786	0.14	2.302	*	1.317	0.17
Degree or equivalent	3.178	*	1.815	0.23	4.185	***	1.288	0.30
Higher degree	5.783	**	2.821	0.42	5.980	***	2.170	0.43
Early Years Home Learning Environment Index (Continuous scale)	0.185	***	0.061	0.20	0.173	***	0.044	0.19
Ofsted Evaluation: Behaviour of Learners: Ref = Inadequate								
Ofsted Judgment: Outstanding	8.632	**	4.379	0.63	3.607		2.552	0.26
Ofsted Judgment: Good	7.736	*	4.293	0.56	2.374		2.465	0.17
Ofsted Judgment: Satisfactory	8.619	**	4.338	0.63	2.388		2.477	0.17
Intercept	81.139	***	4.635		85.199	***	2.688	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.398	***	2.439		7.643	***	1.298	
Variance (Level 1)	189.673	***	4.208		189.144	***	2.909	
Total Variance	202.071				196.787			
Number of Level-1 Observations	1207				2451			
Number of Level-2 Units	314				525			
Deviance (-2 x Log Restricted-Likelihood)	9721.49				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	8.83				9.95			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	29.64				50.84			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	10.45				12.77			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.3.2.2: Contextualised Model: Influence of secondary school quality (Ofsted development and well-being of learners) on pro-social behaviour in Year 9

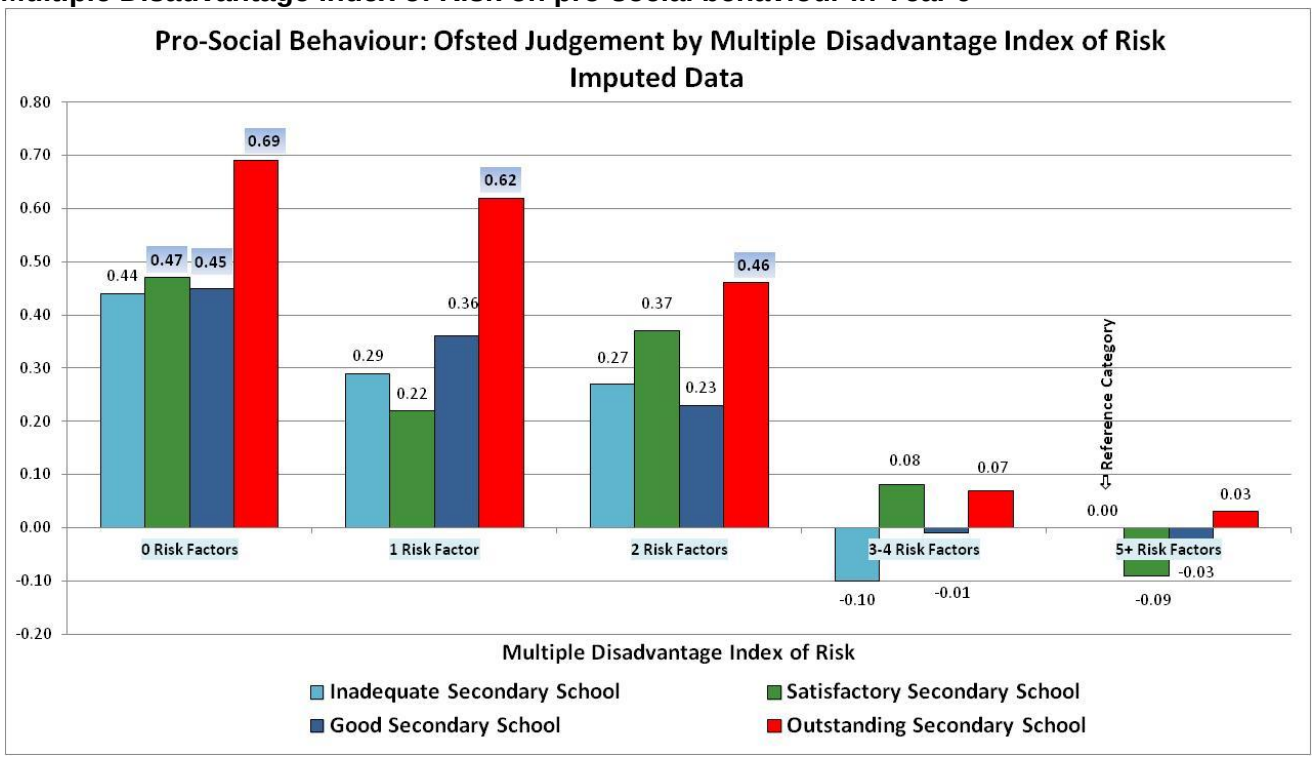
PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Ofsted Development of Learners								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.227	***	0.851	0.45	8.213	***	0.631	0.60
Age within cohort	0.194		0.132	0.09	0.181	*	0.094	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	0.913		2.607	0.07	-0.048		1.748	-0.00
Black Caribbean heritage	-1.395		2.400	-0.10	-1.724		1.675	-0.13
Black African heritage	-0.957		3.198	-0.07	-2.508		2.187	-0.18
Any other ethnic minority	-0.838		2.796	-0.06	-0.955		1.909	-0.07
Indian heritage	2.905		3.085	0.21	1.291		2.017	0.09
Pakistani heritage	-2.070		2.305	-0.15	-0.974		1.506	-0.07
Bangladeshi heritage	10.498	**	5.117	0.76	5.954	*	3.296	0.43
Mixed race	-2.789		1.835	-0.20	-2.664	**	1.341	-0.19
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.756		3.017	-0.05	-1.142		2.299	-0.08
Semi-Skilled	-2.483		1.753	-0.18	-0.858		1.248	-0.06
Skilled Manual	1.717		1.514	0.12	1.776	*	1.049	0.13
Skilled, Non-Manual	4.615	***	1.462	0.34	3.982	***	1.000	0.29
Other Professional, Non-Manual	3.104	**	1.352	0.23	3.950	***	0.977	0.29
Professional, Non-Manual	5.194	**	2.018	0.38	5.501	***	1.442	0.40
Mother's Highest Qualifications Early Yrs: Ref = None								
Other professional/ Misc.	-1.552		3.211	-0.11	-0.039		2.465	-0.00
Vocational	-3.096	**	1.447	-0.22	-0.095		1.022	-0.01
16 academic	1.769		1.215	0.13	2.058	**	0.824	0.15
18 academic	1.985		1.775	0.14	2.507	*	1.306	0.18
Degree or equivalent	3.013	*	1.808	0.22	4.179	***	1.285	0.30
Higher degree	5.885	**	2.819	0.43	5.491	***	2.114	0.40
Early Years Home Learning Environment Index (Continuous scale)	0.175	***	0.061	0.19	0.166	***	0.044	0.18
Ofsted Evaluation: Development and Well-Being of Learners: Ref = Inadequate								
Ofsted Judgment: Outstanding	9.261	**	4.327	0.67	3.652		2.459	0.27
Ofsted Judgment: Good	7.078	*	4.292	0.51	2.030		2.414	0.15
Ofsted Judgment: Satisfactory	8.793	**	4.343	0.64	2.899		2.433	0.21
Intercept	81.655	***	4.624		85.349	***	2.627	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.266	***	2.428		7.400	***	1.279	
Variance (Level 1)	189.568	***	4.195		188.842	***	2.886	
Total Variance	201.835				196.241			
Number of Level-1 Observations	1215				2482			
Number of Level-2 Units	317				527			
Deviance (-2 x Log Restricted-Likelihood)	9785.88				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	8.88				10.10			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	30.38				52.40			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	10.56				13.01			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 4.3.2.3: Interaction effects -Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on pro-social behaviour in Year 9 (Hierarchical Linear Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: INTERACTIONS: Ofsted Evaluation of Secondary School by Number of Individual Risk Factors								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.479	***	0.947	0.47	8.216	***	0.635	0.59
Age within cohort	0.109		0.151	0.05	0.154		0.094	0.07
Ethnicity: Ref = White UK heritage								
White European heritage	1.428		3.109	0.10	0.520		1.745	0.04
Black Caribbean heritage	-2.928		3.364	-0.21	-1.817		1.669	-0.13
Black African heritage	0.892		4.049	0.07	-2.310		2.179	-0.17
Any other ethnic minority	-3.566		3.716	-0.26	-0.651		1.958	-0.05
Indian heritage	1.465		3.886	0.11	2.002		2.057	0.14
Pakistani heritage	-1.213		3.098	-0.09	-0.478		1.565	-0.03
Bangladeshi heritage	9.626		5.909	0.71	6.510	*	3.365	0.47
Mixed race	-2.468		2.071	-0.18	-2.606	*	1.354	-0.19
Number of Siblings: Ref = No Siblings								
1 Sibling	0.921		1.438	0.07	1.445		1.044	0.10
2 Siblings	0.213		1.598	0.02	0.871		1.088	0.06
3+ Siblings	0.277		1.861	0.02	-0.238		1.232	-0.02
Child's Behav Hist:Ref = No Behav Probs								
1 Behavioural Problem	-2.650	*	1.529	-0.19	-3.460	***	1.010	-0.25
2+ Behavioural Problems	-4.845		3.607	-0.35	-1.907		2.192	-0.14
InteractionEffects: Ofsted Evaluation of Secondary School by Number of Risk Factors: Ref= Inadequate Secondary School, 5+ Risk Factors								
Outstanding Secondary School, No Risk	5.250		6.868	0.38	9.589	***	3.477	0.69
Outstanding Secondary School, 1 Risk	5.886		6.907	0.43	8.516	**	3.471	0.62
Outstanding Secondary School, 2 Risk	-0.171		7.116	-0.01	6.325	*	3.627	0.46
Outstanding Secondary School, 3-4 Risk	-2.253		7.199	-0.17	0.991		3.796	0.07
Outstanding Secondary School, 5+ Risk	-5.594		10.363	-0.41	0.359		5.340	0.03
Good Secondary School, No Risk	2.101		6.678	0.15	6.265	*	3.270	0.45
Good Secondary School, 1 Risk	-0.142		6.657	-0.01	4.995		3.252	0.36
Good Secondary School, 2 Risk	-0.963		6.690	-0.07	3.164		3.215	0.23
Good Secondary School, 3-4 Risk	-5.255		6.741	-0.38	-0.102		3.366	-0.01
Good Secondary School, 5+ Risk	-7.958		7.232	-0.58	-0.435		3.591	-0.03
Satisfactory Secondary School, No Risk	2.063		6.831	0.15	6.534	**	3.303	0.47
Satisfactory Secondary School, 1 Risk	-2.476		6.764	-0.18	3.061		3.293	0.22
Satisfactory Secondary School, 2 Risk	-0.412		6.734	-0.03	5.100		3.381	0.37
Satisfactory Secondary School, 3-4 Risk	-1.633		6.768	-0.12	1.118		3.403	0.08
Satisfactory Secondary School, 5+ Risk	-4.339		7.249	-0.32	-1.291		3.934	-0.09
Inadequate Secondary School, No Risk	2.033		7.327	0.15	6.029		3.788	0.44
Inadequate Secondary School, 1 Risk	-0.734		7.309	-0.05	3.947		3.628	0.29
Inadequate Secondary School, 2 Risk	-0.998		7.104	-0.07	3.771		3.498	0.27
Inadequate Secondary School, 3-4 Risk	-5.432		7.053	-0.40	-1.369		3.679	-0.10
Intercept	97.688	***	6.681		91.643	***	3.234	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.710	***	2.968		8.215	***	1.335	
Variance (Level 1)	186.360	***	4.809		191.499	***	2.992	
Total Variance	198.070				199.714			
Number of Level-1 Observations	949				2482			
Number of Level-2 Units	272				527			
Deviance (-2 x Log Restricted-Likelihood)	7544.63				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.059				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	10.42				8.83			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	33.55				47.15			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	12.23				11.47			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

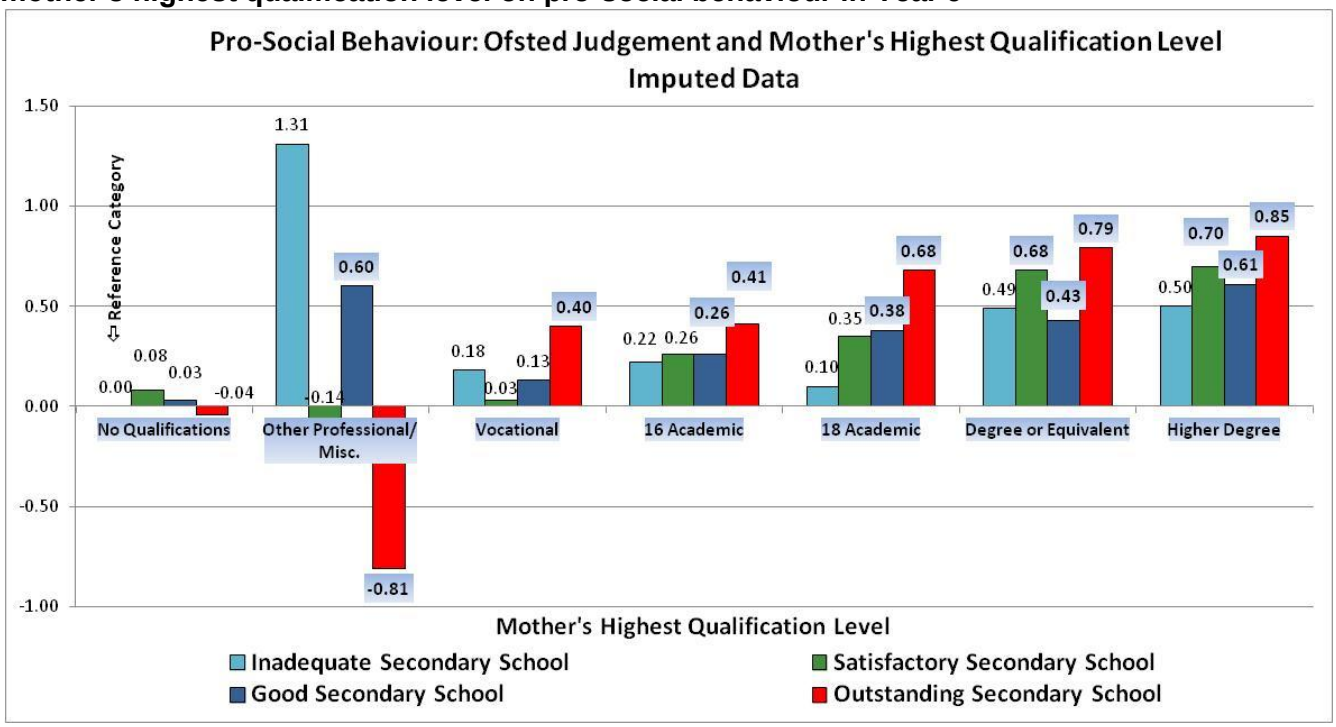
To further clarify this conditional pattern of secondary school influences on 'pro-social' behaviour, we have represented graphically the effect sizes corresponding to expected score differentials for different categories of students in Figure 4.3.2.1.

FIGURE 4.3.2.1: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on pro-social behaviour in Year 9



Whereas a secondary school rated as 'good' or 'satisfactory' can have a positive impact on students' pro-social behaviour in the absence of prior exposure to socio-economic risks, the negative influence of low to moderate levels of such risks only seems to be reduced in secondary education environments of outstanding quality.

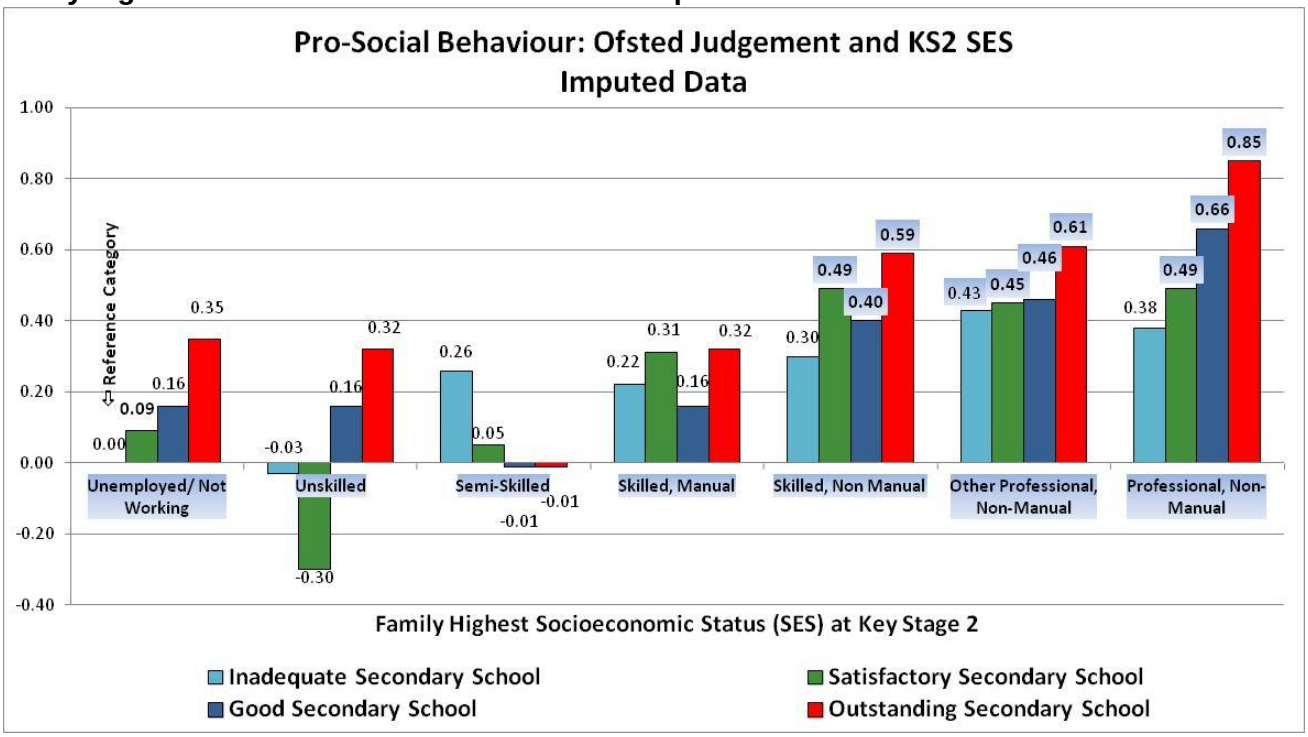
FIGURE 4.3.2.2: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and mother's highest qualification level on pro-social behaviour in Year 9



We also found significant interaction effects between secondary school quality measured by Ofsted and maternal educational qualifications. Students of mothers holding a degree or equivalent, or a higher degree, were rated as significantly more 'pro-social' compared to students of mothers with no educational qualifications who attended inadequate schools. The differences ranged from ES= 0.43 to ES= 0.85, and was proportionate with the level of maternal qualifications and also with the level of school quality (although the same bias in teachers' ratings identified for self-regulation appears to obtain in the case of 'pro-social' behaviour as well, with teachers in schools deemed as 'satisfactory' showing a tendency to overrate their students).

Students of mothers with 16 year and 18 year academic credentials were only rated as being significantly more 'pro-social' if they attended good or outstanding secondary schools (ES ranging between 0.26 and 0.68), and, finally, students of mothers whose highest educational qualification level consisted in vocational training displayed better 'pro-social' abilities provided that they attended schools of outstanding quality (ES = 0.40).

FIGURE 4.3.2.3: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and family highest socio-economic status at KS2 on pro-social behaviour in Year 9



The development of students' 'pro-social' skills at the end of KS3 is also predicted by their socio-economic background. Only students whose parents had been in the professional non-manual and skilled non-manual occupational categories at KS2, and who additionally attended secondary schools rated at least 'satisfactory' following Ofsted inspections, received significantly higher pro-social behaviour ratings compared to students of unemployed parents in secondary schools deemed as inadequate.

Students of unemployed parents or of parents in unskilled, semi-skilled, and skilled non-manual occupations were not significantly distinct from the reference group.

Section 4.3.3: The Impact of Secondary School Ofsted Judgments of Quality on Hyperactivity

TABLE 4.3.3.1: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on hyperactivity in Year 9

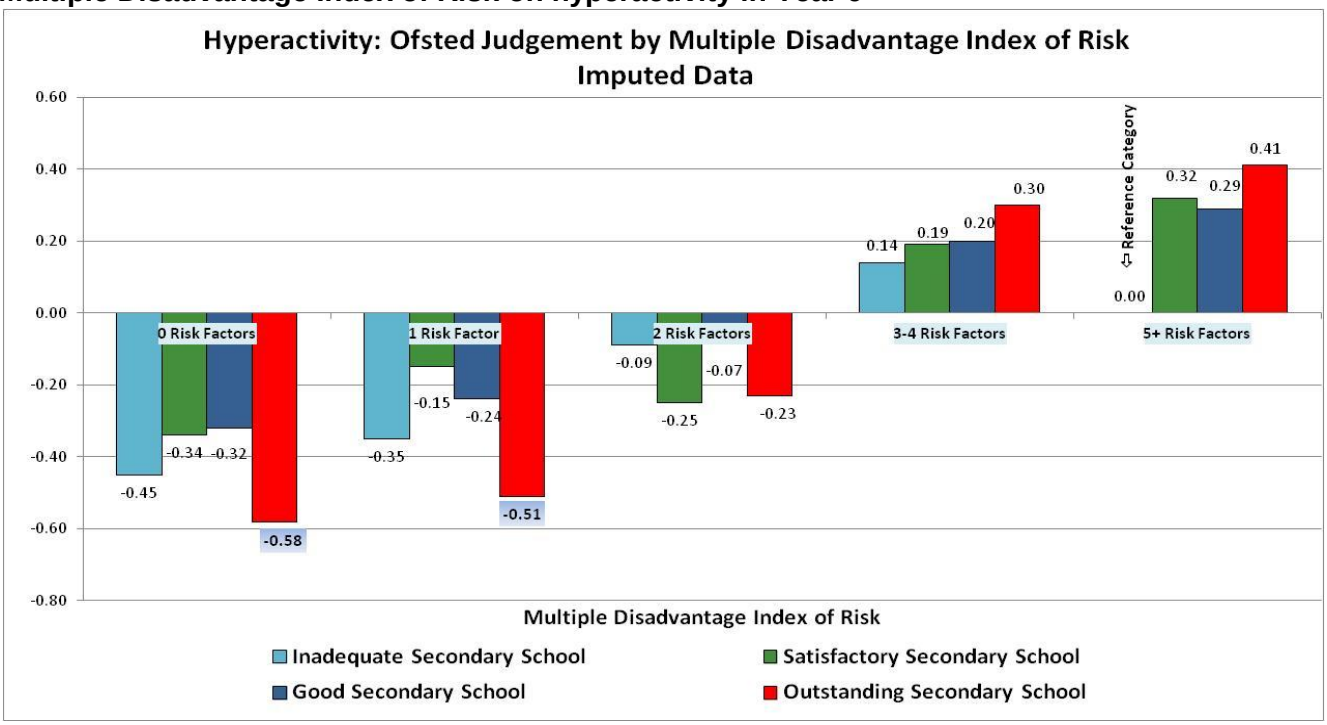
HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: INTERACTIONS: Ofsted Evaluation of Secondary School by Number of Individual Risk Factors								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.861	***	0.930	-0.51	-7.314	***	0.583	-0.53
Age within cohort	-0.039		0.148	-0.02	-0.135		0.091	-0.06
Ethnicity: Ref = White UK heritage								
White European heritage	-3.914		3.060	-0.29	-1.130		1.733	-0.08
Black Caribbean heritage	0.804		3.298	0.06	1.280		1.599	0.09
Black African heritage	3.139		3.964	0.23	2.702		2.190	0.20
Any other ethnic minority	5.071		3.648	0.38	0.046		1.907	0.00
Indian heritage	-6.864	*	3.816	-0.51	-4.722	**	2.079	-0.34
Pakistani heritage	-0.207		3.034	-0.02	-1.253		1.518	-0.09
Bangladeshi heritage	-11.996	**	5.815	-0.89	-9.703	***	3.114	-0.70
Mixed race	1.679		2.034	0.12	2.462	*	1.340	0.18
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.143		1.414	-0.08	-2.262	**	0.988	-0.16
2 Siblings	-1.657		1.573	-0.12	-2.217	**	1.049	-0.16
3+ Siblings	-0.184		1.832	-0.01	-0.485		1.244	-0.04
Child's Behav History:Ref = No Beha Probs								
1 Behavioural Problem	4.407	***	1.506	0.33	4.903	***	1.003	0.35
2+ Behavioural Problems	8.951	**	3.553	0.66	4.594	**	2.168	0.33
InteractionEffects: Ofsted Evaluation of Secondary School by Number of Risk Factors: Ref= Inadequate Secondary School, 5+ Risk Factors								
Outstanding Secondary School, No Risk	-5.056		6.738	-0.37	-8.069	**	3.305	-0.58
Outstanding Secondary School,1 Risk	-4.263		6.776	-0.32	-7.007	**	3.391	-0.51
Outstanding Secondary School, 2 Risk	1.607		6.983	0.12	-3.218		3.566	-0.23
Outstanding Secondary School, 3-4 Risk	6.838		7.067	0.51	4.206		3.486	0.30
Outstanding Secondary School, 5+ Risk	7.628		10.151	0.56	5.710		4.964	0.41
Good Secondary School, No Risk	-2.247		6.557	-0.17	-4.376		3.107	-0.32
Good Secondary School, 1 Risk	0.117		6.537	0.01	-3.297		3.075	-0.24
Good Secondary School, 2 Risk	1.371		6.570	0.10	-0.900		3.123	-0.07
Good Secondary School, 3-4 Risk	6.118		6.620	0.45	2.786		3.173	0.20
Good Secondary School, 5+ Risk	7.791		7.099	0.58	4.065		3.290	0.29
Satisfactory Secondary School, No Risk	-2.493		6.706	-0.18	-4.696		3.250	-0.34
Satisfactory Secondary School, 1 Risk	1.412		6.642	0.10	-2.128		3.174	-0.15
Satisfactory Secondary School, 2 Risk	-1.671		6.613	-0.12	-3.436		3.182	-0.25
Satisfactory Secondary School,3-4 Risk	2.471		6.645	0.18	2.647		3.163	0.19
Satisfactory Secondary School, 5+ Risk	6.072		7.120	0.45	4.385		3.576	0.32
Inadequate Secondary School, No Risk	-4.690		7.196	-0.35	-6.164		3.804	-0.45
Inadequate Secondary School, 1 Risk	-6.123		7.190	-0.45	-4.798		3.646	-0.35
Inadequate Secondary School, 2 Risk	0.507		6.987	0.04	-1.197		3.357	-0.09
Inadequate Secondary School, 3-4 Risk	3.660		6.936	0.27	1.867		3.384	0.14
Intercept	102.484	***	6.565		106.497	***	3.056	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.116	***	2.403		6.351	***	1.241	
Variance (Level 1)	182.467	***	4.620		191.166	***	2.904	
Total Variance	190.583				197.517			
Number of Level-1 Observations	949				2482			
Number of Level-2 Units	272				527			
Deviance (-2 x Log Restricted-Likelihood)	7513.82				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.043				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.60				9.61			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	50.53				54.29			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	15.37				12.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

There are no statistically significant differences in teacher's rating of students' 'hyperactivity' in Year 9 predicted by secondary school quality. However, examining joint effects linked to the degree of socio-economic risk exposure during early childhood, we found statistically distinct groups students. The effects are shown in Table 4.3.3.1 above.

Students who had not been exposed to socio-economic risks such as lone parenting, teenage mothers, unemployed parent, or low quality HLE and who additionally attended secondary schools with an 'outstanding' overall rating, were on average assigned 8.1 points lower 'hyperactivity' scores, corresponding to an effect size ES= -0.58, compared to students exposed to five or more socio-economic risks who were enrolled in inadequate secondary schools in Year 9.

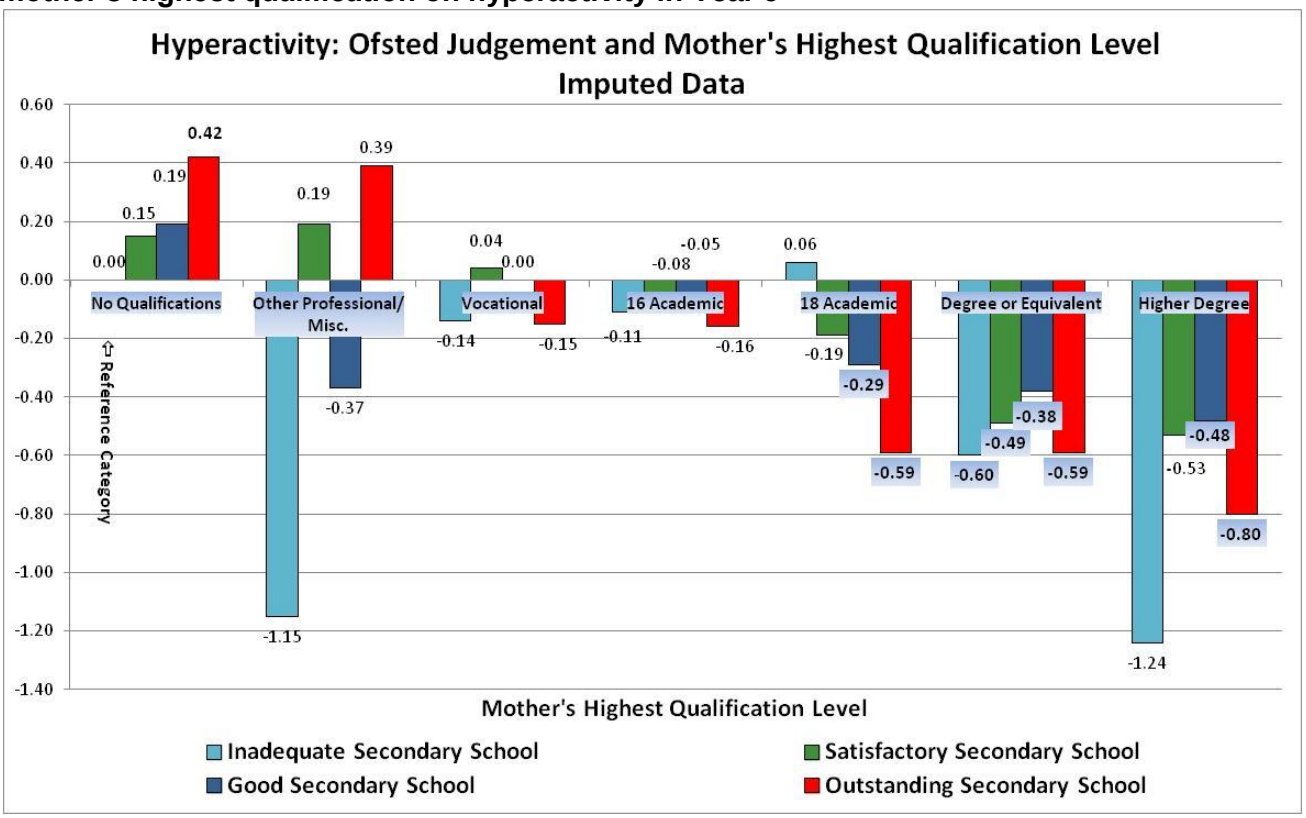
In the presence of one risk factor, students who attended outstanding secondary schools received 'hyperactivity' scores lower by 7 points (ES= -0.51) compared to the same reference group.

FIGURE 4.3.3.1: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on hyperactivity in Year 9



As Figure 4.3.3.1 indicates, no other groups of students were rated as showing significantly different hyperactivity levels with respect to the comparison group, although a general tendency could be observed for teachers to rate students with low socio-economic risk level as less hyperactive, and students with high socio-economic risk exposure as more hyperactive. This tendency was more pronounced in secondary schools deemed as outstanding, which may be because the contrast effect between students with high levels of distractibility, short attention span, and frequent externalizing behaviour, and students with high levels of self-control and attentiveness, is likely to be more prominent in these schools. However, the differences were not statistically significant.

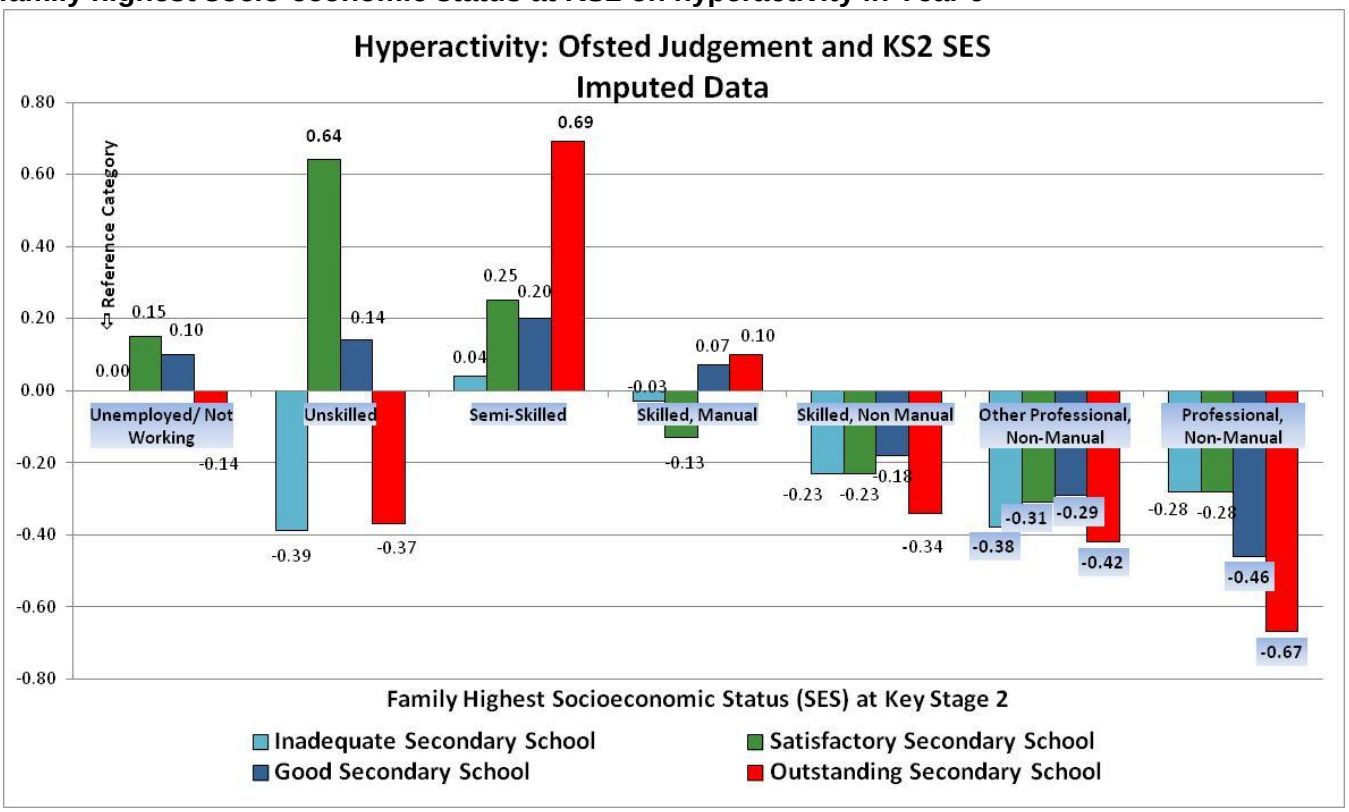
FIGURE 4.3.3.2: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and mother's highest qualification on hyperactivity in Year 9



A joint influence between secondary school quality and maternal educational qualifications is also apparent. More so in the form of a divide between students of higher and lower educated mothers than of an increasing pattern with the secondary school quality within each category of students as delineated by maternal qualifications. Some of the differences, albeit large in magnitude, were not significant for inadequate schools.

High levels of maternal educational qualifications were associated with significantly lower hyperactivity scores, with effect sizes ranging from -0.29 for students of mothers with an 18 year academic qualification who attended secondary schools rated as 'good', to -0.80 for students of mothers holding a higher degree who were in outstanding secondary schools in Year 9.

FIGURE 4.3.3.3: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and family highest socio-economic status at KS2 on hyperactivity in Year 9



In Figure 4.3.3.3., a contrast in hyperactivity levels of students of high and low socio-economic status is evident. Students from families whose highest socio-economic status at KS2 was professional-non manual were rated 9.3 points lower in 'hyperactivity' compared to students of unemployed parents who attended inadequate secondary schools (ES= -0.67).

Students of parents in semi-skilled occupational categories who attended secondary schools of outstanding quality were rated significantly higher in 'hyperactivity'. A possible explanation for this finding is that higher behavioural standards are expected from students in outstanding schools. But at the same time as the majority of students in such schools display significantly less inattentiveness and impulsiveness. Students from families of lower socio-economic status are rated less favourably when compared with these students.

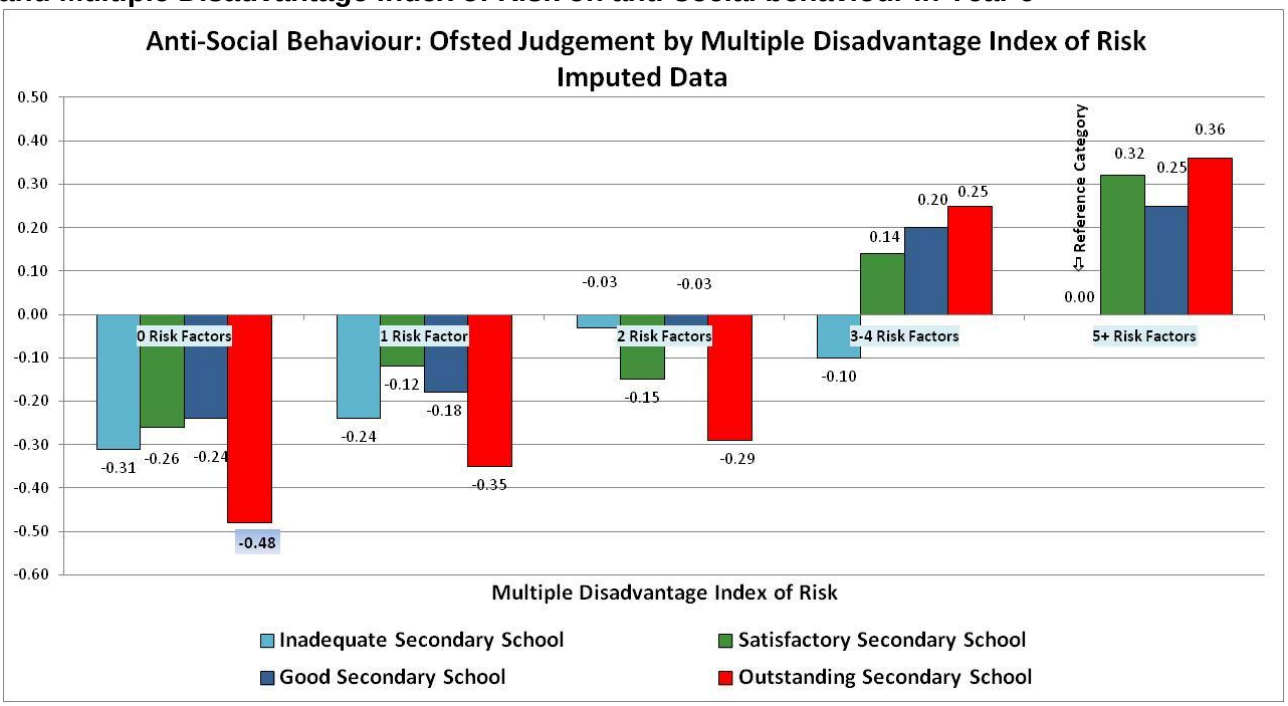
Section 4.3.4: The Impact of Secondary Ofsted Judgments of Quality on Anti-Social Behaviour

FIGURE 4.3.4.1: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: INTERACTIONS: Ofsted Evaluation of Secondary School by Number of Individual Risk Factors								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.494	***	0.924	-0.33	-5.513	***	0.669	-0.39
Age within cohort	0.077		0.147	0.04	-0.016		0.101	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-3.430		3.045	-0.25	-0.970		1.883	-0.07
Black Caribbean heritage	1.139		3.274	0.08	1.508		1.710	0.11
Black African heritage	2.565		3.931	0.19	2.956		2.425	0.21
Any other ethnic minority	7.942	**	3.625	0.59	1.477		2.215	0.10
Indian heritage	-4.232		3.792	-0.31	-2.106		2.178	-0.15
Pakistani heritage	-2.227		3.010	-0.17	-1.670		1.691	-0.12
Bangladeshi heritage	-10.372	*	5.788	-0.77	-7.250	**	3.332	-0.51
Mixed race	1.790		2.022	0.13	2.611		1.621	0.18
Number of Siblings: Ref = No Siblings								
1 Sibling	-2.207		1.407	-0.16	-1.988	*	1.107	-0.14
2 Siblings	-1.850		1.565	-0.14	-1.537		1.144	-0.11
3+ Siblings	-0.671		1.822	-0.05	-0.124		1.324	-0.01
Child Behav History Ref No Behav Probs								
1 Behavioural Problem	3.227	**	1.499	0.24	4.627	***	1.068	0.33
2+ Behavioural Problems	3.776		3.537	0.28	2.580		2.338	0.18
InteractionEffects: Ofsted Evaluation of Secondary School by Number of Risk Factors: Ref= Inadequate Secondary School, 5+ Risk Factors								
Outstanding Secondary School, No Risk	-7.041		6.692	-0.52	-6.851	*	3.637	-0.48
Outstanding Secondary School, 1 Risk	-5.175		6.730	-0.38	-4.932		3.897	-0.35
Outstanding Secondary School, 2 Risk	-4.084		6.938	-0.30	-4.140		4.031	-0.29
Outstanding Secondary School, 3-4 Risk	2.841		7.021	0.21	3.541		3.940	0.25
Outstanding Secondary School, 5+ Risk	15.844		10.075	1.17	5.170		5.340	0.36
Good Secondary School, No Risk	-3.179		6.518	-0.24	-3.472		3.542	-0.24
Good Secondary School, 1 Risk	-1.923		6.498	-0.14	-2.573		3.472	-0.18
Good Secondary School, 2 Risk	-0.147		6.531	-0.01	-0.462		3.626	-0.03
Good Secondary School, 3-4 Risk	3.301		6.581	0.24	2.825		3.505	0.20
Good Secondary School, 5+ Risk	5.401		7.054	0.40	3.519		3.750	0.25
Satisfactory Secondary School, No Risk	-4.696		6.665	-0.35	-3.749		3.623	-0.26
Satisfactory Secondary School, 1 Risk	-1.769		6.602	-0.13	-1.673		3.522	-0.12
Satisfactory Secondary School, 2 Risk	-2.943		6.573	-0.22	-2.134		3.647	-0.15
Satisfactory Secondary School, 3-4 Risk	0.353		6.604	0.03	2.026		3.627	0.14
Satisfactory Secondary School, 5+ Risk	1.596		7.077	0.12	4.545		3.922	0.32
Inadequate Secondary School, No Risk	-5.010		7.151	-0.37	-4.435		4.035	-0.31
Inadequate Secondary School, 1 Risk	-5.821		7.155	-0.43	-3.343		4.010	-0.24
Inadequate Secondary School, 2 Risk	-2.444		6.950	-0.18	-0.468		3.825	-0.03
Inadequate Secondary School, 3-4 Risk	3.472		6.899	0.26	2.501		3.828	0.18
Intercept	104.050	***	6.528		104.636	***	3.499	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	6.113	**	2.268		6.447	***	1.380	
Variance (Level 1)	181.998	***	4.605		202.024	***	3.276	
Total Variance	188.111				208.471			
Number of Level-1 Observations	949				2482			
Number of Level-2 Units	272				527			
Deviance (-2 x Log Restricted-Likelihood)	7504.15				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.032				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	13.98				5.34			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	55.51				46.03			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	16.52				7.49			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

As in the case of 'hyperactivity', no statistically main effects of overall secondary school quality on 'anti-social' behaviour at KS3 emerged in the analyzed sample. Similarly to earlier findings on social-behavioural outcomes, the influences from secondary education were conditional on background factors, although the results suggest that only extremely favourable socio-economic circumstances, coupled with exceptional standards of educational provision, can effectively circumvent the onset of anti-social behaviour in adolescence.

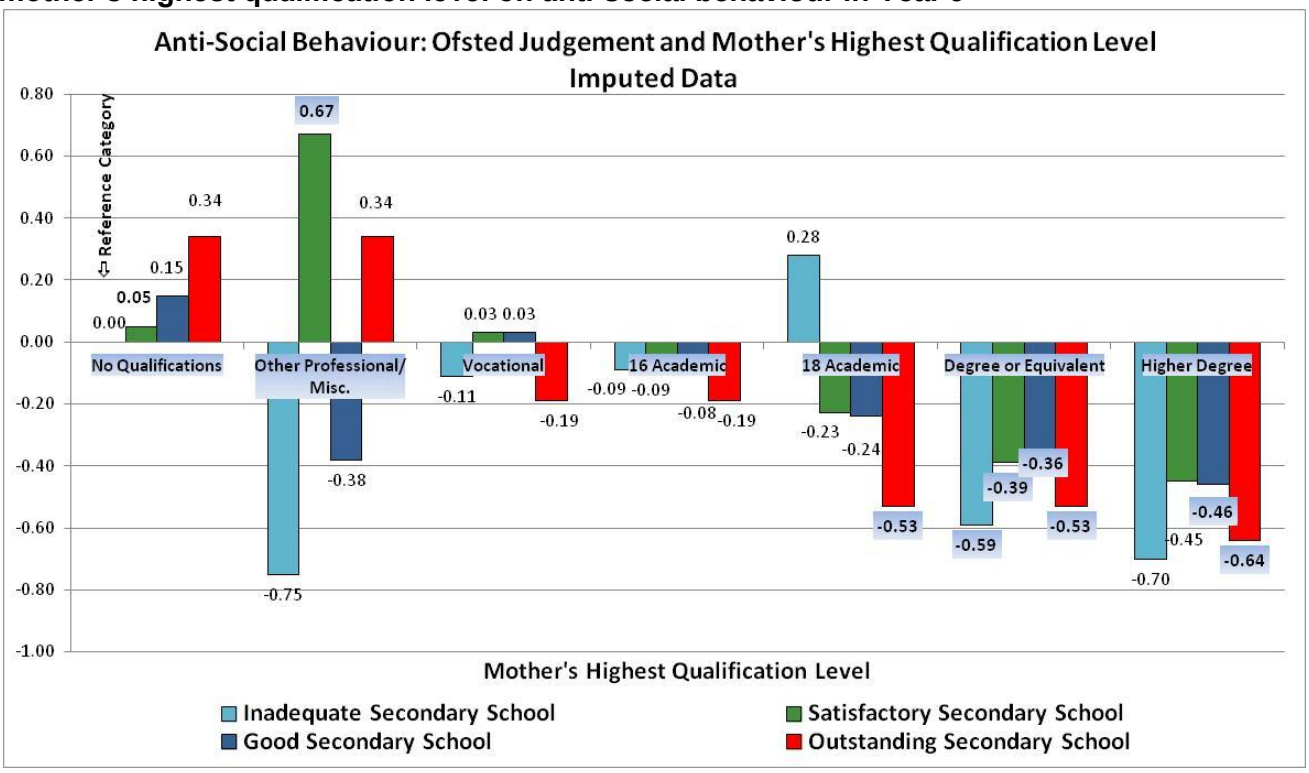
FIGURE 4.3.4.1: Interaction effectsd - Secondary school quality (Ofsted Overall Judgment) and Multiple Disadvantage Index of Risk on anti-social behaviour in Year 9



As evident from Table 4.3.4.1 and Figure 4.3.4.1, only students with no prior exposure to socio-economic and demographic risk factors, and who attended secondary schools deemed as 'outstanding' by Ofsted inspectors showed significantly lower levels of 'anti-social' behaviour in Year 9 compared to those who had been exposed to five or more risk factors in early childhood and went on to attend a secondary school evaluated as 'inadequate' (ES= -0.48).

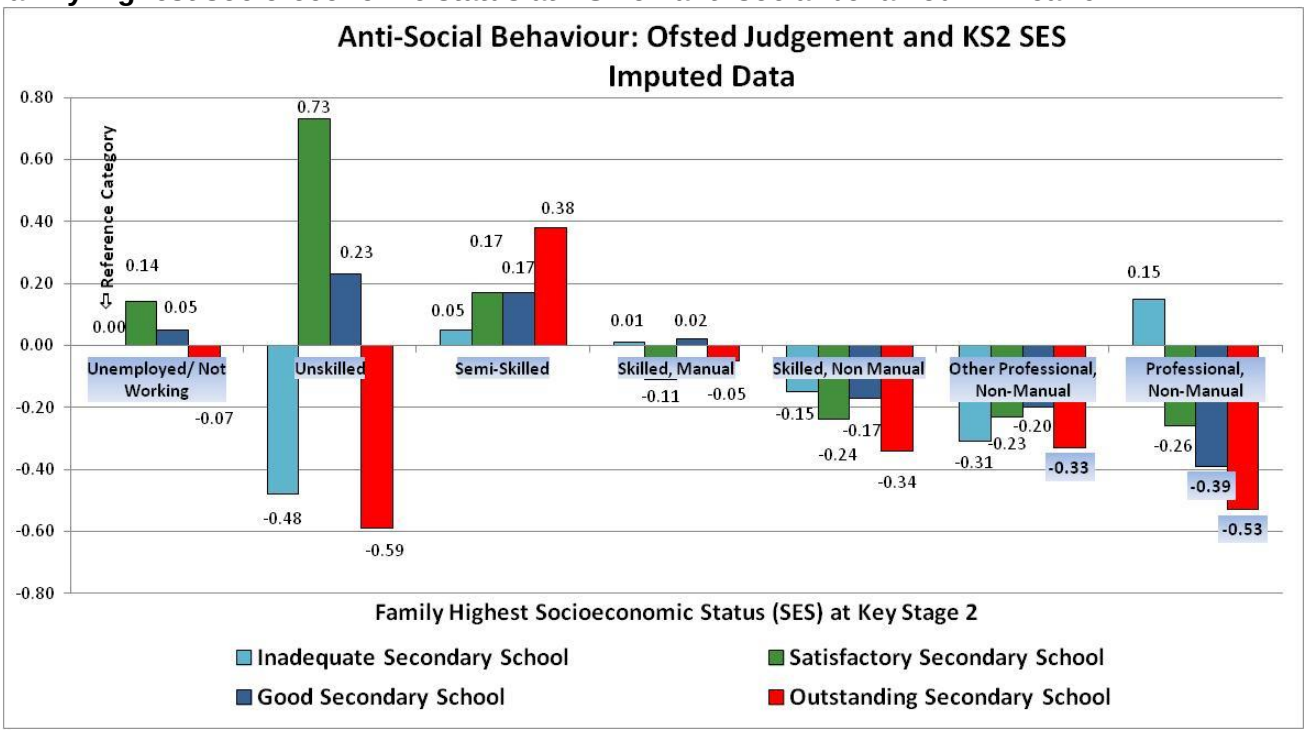
A certain trend can be seem for students with low exposure to risk (no more than two risk factors) in outstanding secondary schools to be rated more favourably compared to highly-at-risk students in inadequate schools, but the corresponding estimates, although relatively large in magnitude, do not attain statistical significance.

FIGURE 4.3.4.2: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and mother's highest qualification level on anti-social behaviour in Year 9



Students of mothers holding a degree or equivalent, or a higher degree, and who additionally attended secondary schools of good or outstanding quality showed significantly lower levels of anti-social behaviour in comparison to students of mothers with no educational qualifications who attended schools deemed as inadequate. Corresponding effect sizes, range between -0.36 and -0.64.

FIGURE 4.3.4.3: Interaction effects - Secondary school quality (Ofsted Overall Judgment) and family highest socio-economic status at KS2 on anti-social behaviour in Year 9



With the exception of students from families of high or very high economic status who attended good or outstanding secondary schools, and who are clearly differentiated from low SES students in

inadequate secondary schools (effect sizes vary between ES=-0.33 and ES=-0.53), there are no significant differences between various categories of students (as determined by school quality and SES) in terms of 'anti-social' behaviour in KS3.

Taken together with findings reported earlier in this section, these results suggest that negative behaviours may be more difficult to eradicate. Overall, secondary schools appeared better at promoting positive social-behavioural outcomes than at mitigating negative outcomes. Even secondary schools deemed as outstanding, especially in the presence of high degrees of socio-economic risk among students, are not protected from factors such as bullying, cheating, or transgressions of legal norms.

High quality secondary educational settings appear quite successful at cultivating academic self-reliance and social competence, but they seem less effective in reducing 'hyperactivity' levels and deflecting trajectories of potential juvenile delinquency.

Note:

In interpreting the relationship between schools' Ofsted ratings and teachers' judgments of EPPSE students' behaviour in Year 9 it should be noted that there may be high variability in assigning behavioural scores from one individual teacher to another, which in turn may affect the accuracy of the measurements, a phenomenon termed in the statistical literature as *inter-rater reliability.*

Several interrelated mechanisms could account for the observed non-linear pattern and the potential measurement bias. First, unlike standardised national tests used to assess academic performance, evaluation criteria and frames of reference for social-behavioural outcomes are widely different among teachers. An implicit standard of comparison is used, and since teachers only can observe the behaviour of the limited pool of students within their schools, they tend to adopt the typical behaviours of this subsample as their frame of reference for the evaluation of specific students' behaviours.

As students in secondary schools rated by Ofsted as better (especially in the behavioural area) presumably exhibit better behaviour, e.g., more self-reliance, better concentration abilities, less relational aggression etc., the expectations placed by teachers on students in these schools may be higher. By comparison, some groups of students who show less adequate behaviour tend to be assigned much lower scores on social-behavioural outcomes.

The enhancement or diminishment of a student's behavioural profile in teachers' perceptions depending on behavioural standards exhibited by other students is a cognitive bias referred to as 'the contrast effect', and for which there is compelling evidence in the field of psychology. Second, as a derivative of the contrast effect, teachers in secondary schools with lower Ofsted ratings may be less exacting and place lower expectations on students' behaviours and as a result they tend to be more lenient in their evaluations and overrate students. It is also possible that in higher quality schools the completion of tasks and assignments is more challenging, requiring more sustained focus, longer attention span, and more self-sufficiency. Some students may need to rely on teachers' assistance more often than they would in less demanding educational environments. Finally, teachers in secondary schools deemed as 'satisfactory' or 'inadequate' may be less experienced or skilled at monitoring and making accurate evaluations of students' social-behavioural outcomes In order to appraise whether there was indeed empirical evidence of such bias, we performed a range of simple statistical tests comparing students' behavioural evaluation and academic test performance in different categories of secondary schools, as classified by Ofsted judgments.

Results revealed that teachers in inadequate schools tend, on average, to rate pupils' levels of self-regulation higher than teachers in satisfactory and good schools (and higher than the sample average). However, their average standardized scores for mathematics were lower than for any other given school category.

Examining further the distributional properties of self-regulation scores and mathematics standardized scores by school quality, we found that students in inadequate schools are rated as being more self-regulated than students in good schools (their median and 25% percentile value were higher, and they never received extremely low ratings, unlike students in all other school categories). Conversely, their level of academic attainment (mathematics scores) was lower (median and 75% percentile are lower than corresponding values for any of the other school categories; moreover, their maximum score never exceeded 120 whereas students in other school quality types could attain scores as high as approx. 135).

Finally, results indicated that students in inadequate schools were (on average) systematically assigned higher self-regulation scores than their counterparts with similar levels of academic attainment who were attending better rated schools. Arguably, academic performance and self-regulation may not necessarily be perfectly interrelated; however, it is unlikely that less adequate secondary schools had a disproportionately high share of low-attaining highly self-regulated students compared to other schools.

SECTION 5: The Impact of Students' Views of School and Self-Perceptions and on Social-behavioural Outcomes in Year 9

In Section 4 the potential impact of secondary school academic effectiveness and quality was gauged using official measures based on standardised test results (KS2-KS2 CVA indicators of school performance calculated by DfE), expert judgments of the quality of education provided by schools made in Ofsted inspection ratings.

In this section we move on to investigate other indicators of the quality and effectiveness of secondary schools as filtered through students' perceptions of their school experiences. By incorporating self report data we are able to add in an important element linked to the 'students' voice'. We thus gain access to a set of alternative indicators that are directly related to students' own school experiences that cannot be readily captured in official evaluations, and which provide further insights into teaching and school processes in secondary schools. By testing both types of measures empirically we aim to provide a more comprehensive picture of e secondary education in KS3 experienced by the EPPSE sample and gain better leverage on complementary aspects retrieved both from the vantage point of expert evaluators, and from students' own experiences of their schooling in the lower secondary years. These additional analyses will serve as a cross-validation of our empirical results bearing on the influences of secondary school quality and effectiveness, and enable us to make further inferences using more detailed measures.

In addition, we will explore other outcome measures derived from self perception data collected on students' dispositions (students' perceptions of their own academic performance in terms of English and mathematics academic self-concept, their enjoyment of school, their normative systems of citizenship values, as well as their predominant emotional states) are linked to their social-behavioural outcomes at the end of KS3.

Information about students' views of school and their dispositions was collected using two questionnaires completed by EPPSE students in Year 9. One questionnaire ('All About Me in School') inquired about students' academic life in the secondary schools they were attending, including amenities and surroundings, school behavioural climate and safety, library and computing facilities, the head teacher's involvement and efficiency, learning strategies adopted by teachers and their respect towards students, and the availability of teacher support.

The second questionnaire ("All About Me") covered aspects such as enjoyment of school and academic self-concept, but also had a broader scope extending to students' personal lives, out-of-school activities and learning processes, and emotional states.[22] In both 'All About Me' and 'All About Me in School' surveys, 4-point Likert agreement scales are used, ranging from strong agreement to strong disagreement. Exploratory and confirmatory factor analyses were carried out to reduce the complexity of the information retrieved from these surveys to a parsimonious set of factors. The EFA and CFA analyses are reported separately (Sammons et al., 2011b, forthcoming). To facilitate interpretation, we have reversed the factor scales to range from strong disagreement to strong agreement. This means that higher factor values indicate higher incidence of the considered school- or student-related aspect.

A total of eight separate factors that reflect features of school and classroom processes were tested for each of the four social-behavioural dimensions after controlling for significant individual, family, HLE and neighbourhood influences. In addition four factors that measure students' dispositions to school were also tested.
The items that relate to these factors are described in Appendix 5.

[22] The latter part of this questionnaire is in some respects similar the Warwick-Edinburgh Mental Well-being Scale (WEMWBS), but records self-reported emotional experiences. Another difference is that WEMWBS employs a 5-point scale and records frequency (most of the time/ some of the time), while the EPPSE-developed instrument uses a 4-point Likert scale capturing extent of the respondent's agreement with statements related to these emotional experiences. For further details on the scale WEMWBS see http://www.healthscotland.com/documents/1467.aspx.

Section 5.1: The Impact of Teaching and School Processes on Students' Social-behavioural Outcomes in Year 9

5.1.1. Emphasis on Learning

Emphasis on learning refers primarily to teaching processes premised on the activation of students' understanding and critical reasoning, rather than on surface learning and short-term memorization ("most teachers want me to understand something, not just memorise it"). It is aligned with the concept of constructivist learning, and sets out to elicit students' engagement in the learning process instead of treating them as passive receivers. The 'emphasis on learning' approach does not exclusively rely on transfer of knowledge, or on the mechanical accumulation and repetition of information, but provides students with the intellectual tools required to embark on active learning, and stimulates the development of higher-order cognitive processes.

Accordingly, teachers devise lessons exacting a high level of student involvement, which mobilize academic resources and help develop intellectual autonomy, but at the same time are not excessively demanding to discourage learners and hurt their confidence and academic self-concept ("lessons are usually 'challenging' but 'do-able' "). Teachers place high expectations on students ("teachers always expect me to do my best"), and they adopt a constructive approach towards mistakes and learning through trial and error ("most teachers believe that mistakes are OK so long as we learn"). Such school environments are also generally characterized by a high level of academic motivation among students, and a high level of aspirations related to academic performance ("most pupils want to do well in exams").

Unsurprisingly, a strong emphasis on learning in the teaching processes is positively related to self-regulation (Table 5.1.1.1), since it stimulates independent thinking, intellectual autonomy, and promotes higher-order cognitive processes, transforming students into better self-regulated individuals, capable of performing tasks without much assistance from others. Students in schools which place a higher emphasis on these higher-order cognitive processes were rated significantly higher in terms of self-regulation. An additional unit increase in the value of the factor measuring 'emphasis on learning' was associated with a 10.2 point increase (68% of a standard deviation) in the value of the self-regulation score according to the estimates on the original data (ES= 0.26), even after taking account of individual background factors and quality of early years HLE. The effect appears somewhat more moderate on the imputed data (ES=0.17)

Teaching processes premised on emphasis on learning were also associated with higher levels of pro-social behaviour (Table 5.1.1.2)[23]. Teachers in schools emphasising active learning presumably enlist the cooperation of students on a frequent basis through interactive learning processes, generating more opportunities for students to volunteer to help others with assigned tasks. For each unit increase in the emphasis on learning school score, students were rated 9.6 points higher in terms of pro-social behaviour (ES=0.25) on the original data.

Students' levels of hyperactivity were inversely related to the degree of emphasis on learning adopted by the secondary schools they attended (Table 5.1.1.3). This can be explained by the fact that interactive learning processes and exercises involving higher-order cognitive skills engage the attention of students to a larger extent compared to mechanical, repetitive tasks. For each additional increase in the value of the emphasis on learning factor, students were assigned 11.7 points lower hyperactivity scores (amounting to 78% of a standard deviation) according to the estimates based on the original data (ES=0.31). This strong effect indicates that in schools where higher-order cognitive processes are consistently promoted, the incidence of hyperactivity among students is likely to be very low.

[23] All tables of estimates in this section are based on multilevel models which include the same statistical controls listed in Table 5.1.1.1. In the interest of space, we are only reporting the estimates which bear immediate relevance on the research questions explored in the current section.

TABLE 5.1.1.1: The influence of students' views of school (Emphasis on Learning) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Emphasis on Learning								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	4.346	***	0.917	0.35	5.901	***	0.562	0.44
Age within cohort	0.367	**	0.144	0.19	0.256	***	0.082	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	4.611		2.817	0.37	0.422		1.502	0.03
Black Caribbean heritage	-3.791		3.118	-0.31	-0.212		1.505	-0.02
Black African heritage	-1.523		5.098	-0.12	-2.241		1.953	-0.17
Any other ethnic minority	0.946		4.208	0.08	0.799		1.804	0.06
Indian heritage	3.356		4.033	0.27	4.226	**	1.924	0.32
Pakistani heritage	-4.229		2.868	-0.34	0.709		1.329	0.05
Bangladeshi heritage	3.686		5.351	0.30	5.163	*	2.681	0.39
Mixed race	0.165		2.006	0.01	-1.493		1.148	-0.11
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low (<=1500g)	5.989		4.363	0.49	-1.580		2.303	-0.12
Low birth weight (1501-2500g)	-3.236		2.027	-0.26	-0.778		1.086	-0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	2.017		1.384	0.16	1.734	*	0.918	0.13
2 Siblings	1.466		1.560	0.12	0.998		0.989	0.07
3+ Siblings	2.525		1.861	0.21	-0.073		1.171	-0.01
Child Behav Hist Ref No Behav Probs								
1 Behavioural Problem	-3.565	**	1.539	-0.29	-4.003	***	0.905	-0.30
2+ Behavioural Problems	-7.783	***	3.013	-0.63	-4.489	**	1.984	-0.34
Parents' Highest SES (KS2): Ref = Unemployed/Not working								
Unskilled	-3.020		3.823	-0.25	-0.257		2.147	-0.02
Semi-Skilled	-1.889		2.255	-0.15	-1.092		1.213	-0.08
Skilled Manual	-0.094		1.939	-0.01	0.808		1.062	0.06
Skilled, Non-Manual	3.395	*	1.831	0.28	4.031	***	0.965	0.30
Other Professional, Non-Manual	2.257		1.709	0.18	3.948	***	0.976	0.30
Professional, Non-Manual	5.617	***	2.111	0.46	5.877	***	1.300	0.44
Mother's Highest Quali E yrs Ref None								
Other professional/ Misc.	1.020		3.426	0.08	2.466		2.238	0.18
Vocational	-1.040		1.831	-0.08	1.144		0.958	0.09
16 academic	1.321		1.564	0.11	2.206	***	0.792	0.16
18 academic	1.991		2.131	0.16	3.948	***	1.201	0.30
Degree or equivalent	3.441	*	1.932	0.28	6.026	***	1.164	0.45
Higher degree	4.582	*	2.486	0.37	6.881	***	1.701	0.51
Marital Status of Parent Ref = Married								
Single	-1.346		1.500	-0.11	-1.680	*	0.927	-0.13
Separated/Divorced	0.487		2.223	0.04	-0.996		1.258	-0.07
Living with partner	-2.259		1.406	-0.18	-2.384	***	0.890	-0.18
Widow/ widower	-1.970		5.401	-0.16	-0.408		2.731	-0.03
Early Years HLE (Continuous scale)	0.169	**	0.067	0.21	0.238	***	0.041	0.27
Emphasis on Learning Factor	10.166	***	2.841	0.26	7.180	***	2.115	0.17
Intercept	99.816	***	3.445		92.201	***	2.217	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	15.058	***	2.934		5.482	***	1.060	
Variance (Level 1)	151.202	***	4.267		179.005	***	2.561	
Total Variance	166.261				184.487			
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6660.23				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.091				0.030			
(%) of Level-1 Variance Reduction [Compared to Null Model]	27.73				14.41			
(%)of Level-2 Variance Reduction [Compared to Null Model]	5.92				66.24			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.18				18.14			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Secondary schools which are more effective at implementing an emphasis on learning approach also appear to have lower prevalence of anti-social behaviour rates (Table 5.1.1.4). For each unit increase in the school's ability to promote active learning (as measured by the computed value of the 'emphasis on learning factor'), the average student anti-social behaviour score diminished by 9.8 points on the original data (ES=0.26), after allowing for individual background influences and variations in the quality of the early years HLE.

An important policy implication is therefore that schools need to supply training to practitioners to cultivate these aspects, as they are conducive to both higher cognitive attainment (see Sammons et al., 2011a, forthcoming), and better social-behavioural outcomes.

TABLE 5.1.1.2: The influence of students' views of school (Emphasis on Learning) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School: Emphasis on Learning								
	ORIGINAL DATA				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Emphasis on Learning Factor	9.633	***	2.858	0.25	6.695	***	2.074	0.16
Intercept	100.144	***	3.466		93.881	***	2.220	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Deviance (-2 x Log Restricted-Likelihood)	6670.36				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.095				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.66				13.23			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	9.43				54.15			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.31				16.05			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.1.3: The influence of students' views of school (Emphasis on Learning) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Emphasis on Learning	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Emphasis on Learning Factor	-11.692	***	2.780	-0.31	-8.278	***	2.151	-0.20
Intercept	94.443	***	3.370		104.943	***	2.333	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6623.96				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.079				0.027			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	30.08				15.02			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	23.23				63.61			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	29.58				18.01			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.1.4: The influence of students' views of school (Emphasis on Learning) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Emphasis on Learning	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Emphasis on Learning Factor	-9.839	***	2.710	-0.26	-6.949	***	1.869	-0.16
Intercept	94.401	***	3.283		102.809	***	2.165	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6580.56				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.058				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.39				9.68			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	36.85				52.33			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.60				11.94			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.2. School Negative Behavioural Climate

This factor captures the incidence of a range of negative aspects related to the behavioural climate in the secondary school attended by the student, and its surroundings. These aspects include disruptive behaviours and violent confrontations ("there are often fights in or around school"), as well as possession of weapons by students in school ("some kids bring knives or weapons into school"), which jeopardize school safety. They also refer to low levels of student discipline and abidance by

school rules, ("most pupils take no notice of school rules"). Further, a negative behavioural climate is also characterized by a strong anti-school ethos whereby the learning attempts of diligent students are met with negative behaviour by other students ("pupils who work hard are given a hard time by others"). It is also marked by teacher indifference towards students' achievement ("teachers don't seem to care whether I work or not"). The lack of school safety and organization is reflected in the absence of school enjoyment and academic motivation ("most pupils want to leave as soon as they can").

Concerns or fears related to school safety, being the target of negative responses from other students if working hard, and facing teacher apathy, are all likely to sap motivation and inhibit the development of intellectual autonomy and academic self-reliance. A negative statistical association was found between negative behavioural climate in secondary schools predicting lower levels of self-regulation of EPPSE students at age 14 (Table 5.1.2.1). The corresponding effect size on the original data is ES=-0.35, and has a very similar value on the imputed data (ES=-0.32).
The school behavioural climate was also inversely related to students' pro-social behaviour in Year 9 (Table 5.1.2.2). A negative school atmosphere predicted lower volunteerism, and low peer sociability and empathetic relations. Conversely, a positive school climate predicted better outcomes in terms of more cooperative attitudes (ES=-0.26 on the original data; ES=-0.30 on the imputed data).

The lack of a sense of personal security while in school is apt to pose serious concentration difficulties, in particular to vulnerable students. Coupled with low teacher involvement, the inability to sustain focus in a negative climate is likely to make attention deficits more prevalent in affected secondary schools. Further, the lack of rule enforcement and school organisation is also likely to exacerbate hyperactivity, especially in susceptible students. Our results show that the more negative the school behavioural climate becomes, the higher the incidence of hyperactivity among attending students will be, even after taking account of individual factors (including behavioural problems in early childhood) and socio-demographic variables (Table 5.1.2.3). The magnitude of the effect of the school's negative behavioural climate reaches similar values on the original (ES=0.32) and the imputed data (ES=0.31).

As might be expected, attending a secondary schools with a negative behavioural climate predicts higher scores for anti-social behaviour (Table 5.1.2.4). The effect size is ES=0.34 on the original data, and somewhat lower (ES=0.25) on the imputed data.

The results above are in agreement with previous school effectiveness research that underscores the importance of the school's overall behavioural climate in shaping both academic and social-behavioural outcomes (see Creemers & Kyriakides, 2008; Rutter et al., 1979; Sammons, Thomas, & Mortimore, 1997; Scheerens & Bosker, 1997).

TABLE 5.1.2.1: The influence of students' views of school (Negative Behavioural Climate) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Negative Behavioural Climate	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Negative Behavioural Climate Factor	-5.981	***	1.399	-0.35	-6.002	***	0.879	-0.32
Intercept	82.172	***	3.615		76.625	***	2.130	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6667.95				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.094				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	28.07				15.82			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	2.27				64.11			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.23				19.30			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.2.2: The influence of students' views of school (Negative Behavioural Climate) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Negative Behavioural Climate	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
FIXED-EFFECTS PARAMETERS	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
[Statistical Output Omitted]								
Views of School: Negative Behavioural Climate Factor	-5.215	***	1.413	-0.30	-4.992	***	0.911	-0.26
Intercept	84.248	***	3.650		80.338	***	2.245	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6683.64				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.096				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.36				14.06			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	7.94				53.19			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	24.92				16.76			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.2.3: The influence of students' views of school (Negative Behavioural Climate) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Negative Behavioural Climate								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Negative Behavioural Climate Factor	5.478	***	1.371	0.32	5.748	***	0.908	0.31
Intercept	112.545	***	3.538		120.986	***	2.160	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6634.52				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.080				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.98				16.06			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	22.79				60.95			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	29.46				18.83			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.2.4: The influence of students' views of school (Negative Behavioural Climate) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Negative Behavioural Climate								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Negative Behavioural Climate Factor	5.703	***	1.327	0.34	4.796	***	1.058	0.25
Intercept	111.488	***	3.424		116.219	***	2.114	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6583.19				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.060				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	34.05				10.31			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	34.71				52.47			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	34.09				12.55			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.3. Headteacher Qualities

This factor measures the extent to which the Headteacher monitors school progress and performs his/her leadership and management functions, while retaining a focus on academic attainment. Specifically, it refers to the Headteacher's commitment to raise student achievement ("the Headteacher is interested in how much we learn"), whether he/she fulfils his/her supervisory role efficiently and intervenes to pre-empt negative behaviours ("the Headteacher makes sure pupils behave well"). In addition to the Headteacher's use of strategic abilities, it also captures their degree of involvement and close monitoring of school activities ("I often see the Headteacher around school").

Students in secondary schools where the Headteacher plays an active role and devises efficient monitoring strategies tend to have better social-behavioural outcomes. As Table 5.1.3.1 indicates, an increase in the global score measuring the Headteacher's qualities predicts better self-regulation outcomes for the EPPSE student sample according to the estimates on the original data (ES=0.21). Higher scores for Headteacher commitment is also significantly related to more pro-social behaviour among students (Table 5.1.3.2). The effect is moderate on the original data (ES=0.29), but less pronounced on the imputed data (ES=0.13).

Further, as Tables 5.1.3.3-5.1.3.4 reveal, in secondary schools where the Headteacher achieves an efficient prevention of negative behaviours (such as impulsive reactions, bullying etc.) it predicts a significantly lower incidence of both hyperactivity (ES=-0.22 on the original data; ES=-0.10 on the imputed data) and anti-social behaviour (ES=-0.28 the original data; ES=-0.12 on the imputed data) among EPPSE students.

TABLE 5.1.3.1: The influence of students' views of school (Headteacher Qualities) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Headteacher Qualities								
	ORIGINAL DATA				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Headteacher Qualities Factor	2.571	**	1.124	0.21	1.172		0.869	0.09
Intercept	95.571	***	3.059		88.017	***	1.774	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	856				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6667.19				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.085				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.21				13.99			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	10.81				64.87			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.12				17.66			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.3.2: The influence of students' views of school (Headteacher Qualities) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Headteacher Qualities	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Headteacher Qualities Factor	3.620	***	1.129	0.29	1.721	**	0.853	0.13
Intercept	97.638	***	3.071		90.817	***	1.728	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	856				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6673.38				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.090				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	25.57				13.00			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	12.88				53.09			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	24.58				15.76			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.3.3: The influence of students' views of school (Headteacher Qualities) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Headteacher Qualities	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Headteacher Qualities Factor	-2.700	**	1.094	-0.22	-1.390	*	0.776	-0.10
Intercept	99.728	***	2.980		109.723	***	1.841	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	856				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6624.23				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.073				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.18				14.44			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	28.80				61.96			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	29.15				17.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.3.4: The influence of students' views of school (Headteacher Qualities) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Headteacher Qualities								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Views of School: Headteacher Qualities Factor	-3.303	***	1.058	-0.28	-1.600	*	0.878	-0.12
Intercept	97.628	***	2.887		106.242	***	1.950	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	856				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6572.97				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.055				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.34				9.37			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	40.53				51.41			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.78				11.60			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.4. School Physical Environment

The School physical environment factor refers to amenities such as attractive buildings, classroom decorations, cleanliness standards ("toilets are well cared for and clean"), good organisation ("my school is well organised"), but also if found to be associated with the school's reputation ("people think my school is a good school"). This factor does not predict self-regulation or hyperactivity, but it is weakly associated with peer sociability (ES=0.19 on the original data; ES=0.10 on the imputed data) and reductions in anti-social behaviour (estimate exclusively significant on the original data, ES=-0.15).

TABLE 5.1.4.1: The influence of students' views of school (School Physical Environment) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_School Physical Environment								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: School Physical Environment Factor	2.745		1.787	0.11	2.025		1.345	0.08
Intercept	95.404	***	3.377		88.815	***	2.233	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6684.72				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.094				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.55				14.04			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	0.24				64.12			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	24.68				17.65			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.4.2: The influence of students' views of school (School Physical Environment) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_School Physical Environment								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: School Physical Environment Factor	4.524	**	1.796	0.19	2.652	*	1.503	0.10
Intercept	98.155	***	3.391		91.615	***	2.200	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6691.95				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.105				0.040			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.11				13.05			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	-2.07				51.57			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	23.91				15.71			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.4.4: The influence of students' views of school (School Physical Environment) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_School Physical Environment								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: School Physical Environment Factor	-3.506	**	1.689	-0.15	-1.970		1.442	-0.07
Intercept	97.865	***	3.201		106.080	***	2.470	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6597.27				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.064				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.08				9.33			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	29.63				50.24			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	32.87				11.50			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.5. Valuing Pupils

An important feature of students' educational experiences in secondary schools is the extent to which teachers and school management are perceived to accept feedback and input from them ("teachers listen to what pupils say about the school", "the school values pupils' views"). This factor also captures the degree of teacher friendliness ("teachers are friendly towards me") and the treatment of students with respect and consideration ("teachers in this school show respect for all pupils"). 'Valuing pupils' also refers to whether teachers display supportive, constructive attitudes, or whether they react to students' mistakes in a disagreeable manner ("teachers are unpleasant if I make mistakes"). Finally, this factor measures the importance ascribed to examination performance by the school ("the school puts too much emphasis on GCSE results").

Attending a secondary school that has a culture of valuing students, shown by their respectful treatment and an appreciation for their opinions, as well as in teacher affability, constructive attitude towards mistakes, predicts better social-behavioural outcomes for the EPPSE sample.

Students whose opinions are considered by school management and teachers, and who perceive they have a 'voice' in the educational process, generally attain higher levels of self-regulation (Table 5.1.5.1), net of individual background and socioeconomic influences (ES=0.31 on the original data; ES=0.15 on the imputed data).

The level of students' pro-social behaviour is also bolstered if they are treated positively (Table 5.1.5.2), ES=0.33 (original data), and ES=0.17 (imputed data).

Finally, a culture of valuing pupils is also associated with a reduction in negative behaviours (Tables 5.1.5.3-5.1.5.4). Effect sizes for hyperactivity are ES=-0.38 on the original data, and ES=-0.18 on the imputed data, whereas for anti-social behaviour the corresponding values are ES=-0.35 and ES=-0.16, respectively.

TABLE 5.1.5.1: The influence of students' views of school (Valuing Pupils) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School: Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Valuing Pupils Factor	6.791	***	1.648	0.31	3.619	***	1.392	0.15
Intercept	100.379	***	3.335		90.793	***	2.147	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6677.49				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.090				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.69				14.37			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	6.09				64.78			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.16				18.00			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.5.2: The influence of students' views of school (Valuing Pupils) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School: Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Valuing Pupils Factor	7.364	***	1.656	0.33	4.018	***	1.450	0.17
Intercept	101.824	***	3.351		93.334	***	2.083	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Variance (Level 1)	152.013	***	4.376		181.982	***	2.605	
Total Variance	168.363				189.290			
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6685.91				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.097				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.93				13.36			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	7.21				52.99			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.39				16.09			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.5.3: The influence of students' views of school (Valuing Pupils) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School: Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Valuing Pupils Factor	-8.278	***	1.604	-0.38	-4.464	***	1.281	-0.18
Intercept	93.416	***	3.245		106.217	***	2.066	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6631.84				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.079				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	30.82				15.02			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	24.55				61.81			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	30.36				17.90			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.5.4: The influence of students' views of school (Valuing Pupils) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School: Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Valuing Pupils Factor	-7.378	***	1.563	-0.35	-4.029	***	1.375	-0.16
Intercept	93.061	***	3.160		103.537	***	2.359	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6587.10				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.057				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	34.15				9.76			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	38.93				51.29			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	34.44				11.96			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.6. Teacher Discipline

The factor related to disciplinary sanctions; “teachers take action when rules are broken”; “make sure it is quiet during lessons”; the reverse of “teachers are not bothered when pupils turn up late”, did not predict any of the social-behavioural outcomes measured at the end of KS3.

5.1.7. School Learning Resources

This factor measures the school’s capacity to extend learning resources which are both sufficient and of adequate quality, such as well-equipped science and computing laboratories (“science labs are good”), (“there are enough computers”), and well-supplied libraries (“we have a good library”). The degree of access to the available facilities and resources (“we get enough time using computers in subject lessons”) is also an important component.

In general, attending a secondary school with better learning resources predicted significantly better social-behavioural outcomes (Table 5.1.7.1-5.1.7.4), taking into account individual, family and HLE background influences.

High quality learning equipment and facilities which are widely accessible appear to promote the development of intellectual autonomy, being associated with higher levels of self-regulation (ES=0.20 on the original data; ES=0.14 on the imputed data).

Better learning resources are also linked to more pro-social behaviour (ES=0.23 on the original data; ES=0.14 on the imputed data), and a reduction in anti-social Behaviour (ES=-0.19 on the original data; ES=-0.12 on the imputed data). Inattentiveness and hyperactivity also seem to be reduced in the presence of adequate learning resources (ES=-0.22 on the original data; ES=-0.15 on the imputed data).

TABLE 5.1.7.1: The influence of students’ views of school (School Learning Resources) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Learning Resources Factor	8.244	***	2.932	0.20	6.265	***	2.174	0.14
Intercept	97.890	***	3.358		90.832	***	2.055	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6678.19				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.092				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.93				14.30			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	2.93				64.88			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.23				17.94			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.7.2: The influence of students' views of school (School Learning Resources) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Learning Resources Factor	9.435	***	2.947	0.23	6.408	***	2.262	0.14
Intercept	99.455	***	3.375		92.998	***	2.064	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6687.03				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.099				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.13				13.25			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	4.04				52.18			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	24.41				15.93			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.7.3: The influence of students' views of school (School Learning Resources) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Learning Resources Factor	-8.625	***	2.866	-0.22	-6.499	***	1.812	-0.15
Intercept	97.371	***	3.282		107.031	***	1.984	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6640.15				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.083				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.57				14.71			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	18.93				62.22			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	28.79				17.64			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.7.4: The influence of students' views of school (School Learning Resources) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Learning Resources Factor	-7.350	***	2.788	-0.19	-5.635	**	2.207	-0.12
Intercept	96.832	***	3.192		104.435	***	2.383	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6593.63				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.062				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.19				9.48			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	31.93				51.87			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.12				11.73			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.1.8. Teacher Support

An important domain related to secondary school quality and effectiveness is the extent of available competent teacher support. The hallmark of a supportive teacher consists in providing feedback in the form of helpful comments rather than just using criticism ("most teachers make helpful comments on my work"), and giving due encouragement and recognition for sustained work performance ("teachers praise me when I work hard") as well as concrete suggestions for improvement ("teachers tell me how to make my work better"). It is also related to setting clear expectations and learning targets ("during most lessons I know what I am supposed to learn"; "teachers make the aims of lessons clear") , and availability to provide assistance to meet the individual needs of each student ("teachers are available to talk to me privately"). Finally, teacher support refers to positive reinforcement, a goal advanced by creating an incentive structure that promotes appropriate behaviour ("I get rewarded for good behaviour").

Higher levels of teacher support are found to predict better social-behavioural outcomes (Tables 5.1.8.1-5.1.8.4). Increases in teacher supportiveness are significantly associated with higher levels of self-regulation (ES=0.19 on the original data; ES=0.09 on the imputed data), as clear expectations, constructive feedback, and recognition of effort may help promote academic autonomy.

Secondary schools with more supportive teachers also registered higher levels of pro-social behaviour in year 9 (ES=0.23 on the original data; ES=0.11 on the imputed data). Through their attitudes towards students, supportive teachers are likely to set examples which are followed by students and mirrored in supportive attitudes towards peers. A similar mechanism could underpin the mitigation of anti-social behaviours (ES=-0.17 on the original data; ES=-0.08 on the imputed data).

Providing clearly delineated learning goals and expectations, and supplying constructive feedback, can be hypothesized to promote more effective study habits and ameliorate hyperactivity symptoms in predisposed students. Attending a secondary school where teacher support is high, predicts lower hyperactivity scores for EPPSE students, even after controlling for socio-demographic influences and factors related to individual behavioural history (ES=-0.17 on the original data; ES=-0.08 on the imputed data).

TABLE 5.1.8.1: The influence of students' views of school (Teacher Support) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Teacher Support Factor	4.030	***	1.523	0.19	2.008	*	1.047	0.09
Intercept	97.803	***	3.402		89.251	***	2.052	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	846				2930			
Number of Level-2 Units	318				775			
Deviance (-2 x Log Restricted-Likelihood)	6578.93				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.092				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.34				14.03			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	3.73				65.12			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.66				17.71			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.8.1: The influence of students' views of school (Teacher Support) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Teacher Support Factor	4.784	***	1.527	0.23	2.575	**	1.066	0.11
Intercept	99.725	***	3.411		92.107	***	2.020	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	846				2930			
Number of Level-2 Units	318				775			
Deviance (-2 x Log Restricted-Likelihood)	6583.46				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.094				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.66				13.03			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	9.70				53.11			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.34				15.79			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.8.3: The influence of students' views of school (Teacher Support) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Teacher Support Factor	-3.417	**	1.500	-0.17	-1.878	*	1.139	-0.08
Intercept	98.461	***	3.349		108.955	***	2.142	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	846				2930			
Number of Level-2 Units	318				775			
Deviance (-2 x Log Restricted-Likelihood)	6552.47				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.077				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	28.65				14.44			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	24.46				61.98			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	28.35				17.37			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.1.8.4: The influence of students' views of school (Teacher Support) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Views of School: Teacher Support Factor	-3.439	**	1.462	-0.17	-1.765	*	1.009	-0.08
Intercept	96.992	***	3.262		105.916	***	2.184	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	846				2930			
Number of Level-2 Units	318				775			
Deviance (-2 x Log Restricted-Likelihood)	6508.78				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.058				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	32.27				9.33			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	35.33				50.35			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	32.46				11.51			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 5.2: The Impact of Students' Self-Perceptions on Their Social-behavioural Outcomes in Year 9

5.2.1 Academic Self-Concept: Mathematics and English

Academic self-concept was measured by two separate arrays of survey items capturing various aspects pertaining to academic performance in Mathematics and English: intake abilities ("I learn things quickly in my [Math/English] class"), retrospective performance evaluations ("I have always done well in my [Math/English] class"), relative performance appraisals in comparison to similarly aged students ("compared to others my age I am good at [Math/English"), as well as level of difficulty experienced by the student during the completion of school assignments ("work in my [Math/English] classes is easy for me

Existing theories propose that meta-cognitive strategies involving self-monitoring and evaluation of one's academic performance in order to achieve self-improvement are consistently employed by self-regulated learners (Zimmerman & Martinez-Pons, 2004), underscoring the importance of self-perceptions for self-regulation. Research by Craven & Marsh (2008) and Marsh & O'Mara (2008) has explored the links between self concept and achievement also and demonstrated the importance to notions of well being. Our empirical data lends support to this notion. Thus, higher self-perceived levels of proficiency in mathematics and English are associated with higher levels of self-regulation. For mathematics, the corresponding effect sizes are ES=0.46 on the original data and ES=0.45 on the imputed data, respectively. Academic self-concept in English is somewhat less strongly connected to self-regulation (ES=0.24 on the original data; ES=0.31 on the imputed data).

Students with a higher academic self-concept in either curricular subject are more inclined to volunteer their assistance to teachers and peers, presumably because they feel more confident in their abilities to effectively assist others. Effect sizes capturing the impact of self-concept in mathematics on levels of pro-social behaviour are ES=0.25 on the original data, and ES=0.31 on the imputed data. As in the case of self-regulation, numeracy skills are more strongly connected to social-behavioural outcomes than literacy skills. The effect sizes for academic self-concept in English are ES=0.15 on the original data, and ES=0.23 on the imputed data.

As we have pointed out in Section 2, the academic literature has consistently reported a systematic relationship between hyperactivity/inattentiveness and diminished academic performance (Merrell & Tymms, 2001; Saudino & Plomin, 2007). The hypothesised relationship is also borne out by our empirical data. Accordingly, a positive academic self-concept in both English and mathematics significantly co-varies with a reduced incidence of hyperactivity (ES=-0.32 on the original data and ES=-0.38 on the imputed data for mathematics; ES=-0.18 on the original data and ES=-0.27 on the imputed data for English, respectively).

The increased ability of adolescents to make comparative evaluations of their performance in respect to others' and the resulting higher levels of aggressiveness towards peers among those who perceive their performance as inadequate postulated in the academic literature (see e.g., Miles & Stipek, 2006) also receives empirical support in our data. A weaker self concept in mathematics is linked to higher levels of anti-social behaviour (ES=-0.15 on the original data; ES=-0.26 on the imputed data). Similarly, in English a weaker self concept is significantly associated with more aggressive behaviour (ES=-0.12 on the original data; ES=-0.20 on the imputed data).

The causal ordering linking academic self-concept to social-behavioural outcomes should not be seen as uni-directional and a number of researchers argue, that the causality direction is likely to be reciprocal (see e.g., Marsh et al., 2005a; 2005b), and there could be mutually reinforcing processes. Regardless of the direction of influence, these analyses have shown that academic processes reflected in the measure of academic self concept are inextricably linked to social-behavioural outcomes.

TABLE 5.2.1.1.a: The influence of students' self-perceptions (Academic Self-Concept: maths) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_maths Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Mathematics Factor	4.489	***	0.744	0.46	4.717	***	0.536	0.45
Intercept	101.117	***	3.055		96.266	***	1.915	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6649.08				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.095				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.88				17.80			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	4.04				65.99			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	28.04				21.27			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.1.b: The influence of students' self-perceptions (Academic Self-Concept: English) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_English Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: English Factor	2.931	***	0.889	0.24	4.021	***	0.617	0.31
Intercept	98.236	***	3.288		94.967	***	2.003	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6665.96				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.087				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.26				15.83			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	9.13				66.08			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.97				19.45			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.2.a: The influence of students' self-perceptions (Academic Self-Concept: maths) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_maths Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Mathematics Factor	2.542	***	0.760	0.25	3.285	***	0.495	0.31
Intercept	98.243	***	3.122		95.350	***	1.981	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6684.67				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.095				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.35				14.65			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	9.17				53.61			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.01				17.33			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.1.b: The influence of students' self-perceptions (Academic Self-Concept: English) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_English Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: English Factor	1.822	**	0.899	0.15	2.921	***	0.710	0.23
Intercept	96.972	***	3.324		94.706	***	2.465	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6683.95				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.092				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	25.49				13.84			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	11.38				53.00			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	24.38				16.54			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.3.a: The influence of students' self-perceptions (Academic Self-Concept: maths) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_ maths Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Mathematics Factor	-3.104	***	0.735	-0.32	-4.055	***	0.555	-0.38
Intercept	97.298	***	3.017		103.139	***	1.931	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6627.78				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.079				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	30.63				17.16			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	24.69				62.70			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	30.20				19.97			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.3.b: The influence of students' self-perceptions (Academic Self-Concept: English) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_English Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: English Factor	-2.130	**	0.871	-0.18	-3.420	***	0.689	-0.27
Intercept	99.134	***	3.221		104.333	***	2.157	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6632.01				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.077				0.027			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.51				15.64			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	24.65				64.13			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	29.15				18.63			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.4.a: The influence of students' self-perceptions (Academic Self-Concept: maths) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_ maths Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Mathematics Factor	-1.399	*	0.718	-0.15	-2.899	***	0.572	-0.26
Intercept	99.438	***	2.945		102.341	***	1.864	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6587.42				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.065				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	34.08				10.61			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	29.86				52.18			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.82				12.82			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.1.4.b: The influence of students' self-perceptions (Academic Self-Concept: English) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_English Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: English Factor	-1.365		0.845	-0.12	-2.697	***	0.760	-0.20
Intercept	99.418	***	3.124		102.658	***	2.220	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	857				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6581.32				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.064				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.89				10.04			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	30.02				52.39			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.66				12.29			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.2.2 Enjoyment of School

Ensuring a high level of school enjoyment among learners represents one of the core educational objectives stipulated in the Every Child Matters agenda that was a major policy initiative promoted in English schools during the time EPPSE students were in school and at the same time was an important criterion used in conjunction with Ofsted inspections. Our measure of this factor is related to positive perceptions of the school environment ("on the whole I like being at school"; "my school is a friendly place"). It also includes survey items capturing academic motivation ("I always like to answer questions in class"; "I like most of the lessons"), and an item measuring learner's boredom in the classroom ("I am bored in lessons"), which could be an indicator of low academic standards, or the result of the student's insufficient preparation to understand the content being delivered by the teacher, possibly also coupled with a lack of motivation. Not least, enjoyment of school is linked to the perceived importance ascribed to school attendance ("school is a waste of time for me").

Enjoyment of school was found to be consistently predictive of students' social-behavioural outcomes in Year 9 (Tables 5.2.2.1-5.2.2.4). Prospective benefits derived from education can be hypothesized to boost academic motivation and student participation in class, which in turn reinforces intellectual autonomy. Students who reported high levels of school enjoyment were also systematically rated as better self-regulated in KS3 by their teachers (ES=0.46 on the original data; ES=0.33 on the imputed data).

A positive school environment is likely to foster cooperative relationships and higher levels of peer sociability. Higher enjoyment of school as indicated by students' self-report was consistently associated with higher levels of pro-social behaviour in Year 9 (ES=0.39 on the original data; ES=0.28 on the imputed data). Conversely, perceived hostility of the school environment can be expected to instill feelings of alienation, and generate more pronounced tendencies toward anti-social behaviour (ES=-0.30 on the original data; ES=-0.22 on the imputed data). Low anticipated benefits from education and experienced boredom during lessons adversely affects students' capacity to sustain focus and motivation, and may lead to externalizing behaviours. Higher hyperactivity rates were more prevalent among students who reported low enjoyment of school (ES=-0.38 on the original data; ES=-0.28 on the imputed data).

TABLE 5.2.2.1: The influence of students' self-perceptions (Enjoyment of School) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Enjoyment of School								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Enjoyment of School Factor	11.361	***	1.836	0.46	8.815	***	1.401	0.33
Intercept	105.220	***	3.384		97.193	***	2.313	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	861				2930			
Number of Level-2 Units	322				775			
Deviance (-2 x Log Restricted-Likelihood)	6668.44				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.085				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.53				15.93			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	14.45				67.73			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	28.45				19.66			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.2.2: The influence of students' self-perceptions (Enjoyment of School) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Enjoyment of School								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Enjoyment of School Factor	9.671	***	1.862	0.39	7.498	***	1.343	0.28
Intercept	104.218	***	3.430		97.647	***	2.197	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	861				2930			
Number of Level-2 Units	322				775			
Deviance (-2 x Log Restricted-Likelihood)	6691.17				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.087				0.037			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.25				14.21			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	18.43				55.74			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.56				17.07			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.2.3: The influence of students' self-perceptions (Enjoyment of School) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Enjoyment of School								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Enjoyment of School Factor	-9.373	***	1.803	-0.38	-7.546	***	1.433	-0.28
Intercept	92.620	***	3.321		102.369	***	2.295	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	861				2930			
Number of Level-2 Units	322				775			
Deviance (-2 x Log Restricted-Likelihood)	6636.92				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.077				0.027			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	31.59				15.77			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	27.33				64.51			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	31.28				18.77			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.2.4: The influence of students' self-perceptions (Enjoyment of School) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Enjoyment of School								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Enjoyment of School Factor	-7.104	***	1.758	-0.30	-6.126	***	1.386	-0.22
Intercept	94.046	***	3.236		100.902	***	2.255	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	861				2930			
Number of Level-2 Units	322				775			
Deviance (-2 x Log Restricted-Likelihood)	6593.10				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	35.16				10.11			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	34.66				53.98			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	35.13				12.43			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.2.3. Popularity

The Me at School Questionnaire instrument also recorded students' readiness in establishing friendship ("I make friends easily"), how extended their social networks were ("I have more friends than other teenagers my age"), and the degree of popularity they felt they enjoyed among similarly aged students ("I am popular with other pupils in my age group").

Perceiving themselves as being popular was not very predictive of social-behavioural outcomes at age 14 to any noteworthy extent. Estimates were marginally significant, and exclusively on the imputed data, for self-regulation and pro-social behaviour, although the magnitude of the corresponding effect sizes was negligible. Popularity was only weakly linked to pro-social behaviour, suggesting that those who show empathy for others and volunteer their assistance and may not necessarily be the most popular students in school.

5.2.4. Anxiety Behaviours

As previously indicated, survey items similar to the WEMWBS scale were used to tap into students' emotional states at the age of adolescence. The instrument recorded the presence of apprehension symptoms such as frequent worries ("I worry a lot"), unhappiness, depressive moods ("I am often unhappy, downhearted, or tearful"), but even (potentially) psychosomatic symptoms such as headaches, stomach aches, or sickness ("I get a lot of headaches, stomach aches or sickness"). Anxiety behaviours are also related to nervousness/lack of self-confidence ("I am nervous in new situations") and negative expectations ("I have many fears, I am easily scared"). Students who rated themselves as more anxious showed poorer self-regulation in teachers' ratings compared with students who rated themselves as less anxious, even in the presence of otherwise similar socioeconomic and individual background circumstances (ES=-0.15 on the original data; ES=-0.13 on the imputed data). Anxiety behaviours were not significantly linked to pro-social behaviour.

Anxious students were also more prone to externalising behaviour, a higher prevalence of hyperactivity being reported by teachers for such students (ES=0.16 on the original data; ES=0.11 on the imputed data). Anxiety manifestations have also been linked to co-morbid disorders occurring especially in highly hyperactive students (e.g., those diagnosed with ADHD).

There are also some indications of a positive association between anxiety symptoms and maladaptive/anti-social behaviours, especially observable on the non-imputed data (ES=0.15).

TABLE 5.2.4.1: The influence of students' self-perceptions (Anxiety Behaviours) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Anxiety Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Anxiety Factor	-2.767	**	1.399	-0.15	-2.660	***	1.022	-0.13
Intercept	87.240	***	3.649		81.852	***	2.159	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6680.14				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.089				0.030			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.68				14.18			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	6.93				65.74			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	25.28				17.90			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.4.2: The influence of students' self-perceptions (Anxiety Behaviours) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Anxiety Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Anxiety Factor	2.959	**	1.367	0.16	2.263	**	1.102	0.11
Intercept	108.655	***	3.563		115.483	***	2.366	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6639.90				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.075				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.25				14.50			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	27.48				62.90			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	29.12				17.49			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.4.3: The influence of students' self-perceptions (Anxiety Behaviours) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Anxiety Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Anxiety Factor	2.633	**	1.323	0.15	1.550		1.081	0.07
Intercept	106.853	***	3.448		111.049	***	2.540	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	858				2930			
Number of Level-2 Units	321				775			
Deviance (-2 x Log Restricted-Likelihood)	6585.84				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.063				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	33.98				9.30			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	32.06				51.25			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	33.87				11.52			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

5.2.5. Citizenship Values

The Citizenship values factor aimed to capture the normative system of values underpinning students' behaviours and prescribing appropriate behaviour or course of action in various circumstances. Students were asked to indicate the importance they attached to a range of actions or behaviours such as offering assistance to a friend in a difficult situation ("helping a friend who is in trouble"), showing respect for others' opinions ("respecting other people's point of view"), attempt an amicable resolution of conflicts ("sorting out disagreements without fighting"), exercising self-restraint and controlling impulsiveness ("controlling your temper even when you feel angry"), observing rules, and law abidance ("respecting rules and laws"). Citizenship values also referred to the importance of preventing unacceptable behaviour such as bullying ("make sure strong people don't pick on weak people").

Students who endorse these citizenship values to a large extent (and presumably also exert better behaviour management) were rated as significantly better regulated by Year 9 teachers (ES=0.30 on the original data; ES=0.17 on the imputed data).

The Citizenship values factor also predicted better pro-social behaviour scores (ES=0.36 on the original data; ES=0.16 on the imputed data). As previously indicated, pro-social behaviour is increasingly connected to moral judgments at the age of adolescence (Eisenberg et al., 1995).

Students who do not ascribe a very high importance to peaceful conflict resolution, exercising self-restraint, controlling one's temper when feeling angry, maintaining civil relationships even in the presence of disagreements, respecting other people's point of view, are generally rated by teachers as displaying higher levels of hyperactivity (diminished ability to control impulsive behaviour and reduced concentration capacity/ short attention spans). Corresponding effect sizes are ES=-0.29 on the original data, and ES=-0.17 on the imputed data.

Students who have less positive views in terms of Citizenship values s are rated significantly higher in terms of anti-social behaviour (ES=-0.23 on the original data; ES=-0.13 on the imputed data), taking into account the influence of socio-demographic and other background influences .

TABLE 5.2.5.1: The influence of students' self-perceptions (Citizenship Values) on self-regulation in Year 9

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_ Citizenship Values Factor								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
FIXED-EFFECTS PARAMETERS	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
[Statistical Output Omitted]								
Self-Perceptions: Citizenship Values Factor	5.279	***	1.295	0.30	3.293	***	0.951	0.17
Intercept	98.913	***	3.162		91.286	***	2.036	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6675.39				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.079				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	27.27				14.49			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	18.58				64.91			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.65				18.12			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.5.2: The influence of students' self-perceptions (Citizenship Values) on pro-social behaviour in Year 9

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_ Citizenship Values Factor								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
FIXED-EFFECTS PARAMETERS	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
[Statistical Output Omitted]								
Self-Perceptions: Citizenship Values Factor	6.303	***	1.299	0.36	3.132	***	0.928	0.16
Intercept	101.218	***	3.171		93.121	***	1.991	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6680.33				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.084				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	26.75				13.33			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	20.26				52.64			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	26.24				16.04			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.5.3: The influence of students' self-perceptions (Citizenship Values) on hyperactivity in Year 9

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Citizenship Values Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Citizenship Values Factor	-4.980	***	1.266	-0.29	-3.342	***	0.976	-0.17
Intercept	97.072	***	3.089		106.668	***	1.929	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6636.45				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.066				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	29.76				14.89			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	36.66				62.47			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	30.26				17.82			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 5.2.5.4: The influence of students' self-perceptions (Citizenship Values) on anti-social behaviour in Year 9

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Self-Perceptions_Citizenship Values Factor								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
[Statistical Output Omitted]								
Self-Perceptions: Citizenship Values Factor	-3.879	***	1.229	-0.23	-2.590	***	0.918	-0.13
Intercept	97.273	***	2.998		104.574	***	2.035	
RANDOM-EFFECTS PARAMETERS								
[Statistical Output Omitted]								
Number of Level-1 Observations	859				2930			
Number of Level-2 Units	323				775			
Deviance (-2 x Log Restricted-Likelihood)	6586.93				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.055				0.029			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	34.15				9.56			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	40.43				50.98			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	34.53				11.75			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

A summary of the relative impact of students' views of school and self-perceptions on their social-behavioural outcomes in Year 9 can be scrutinized in Tables 5.1 (original data) and Table 5.2 (imputed data).

TABLE 5.1: The Influence of Students' Views of Schools and Self-Perceptions on Social/ Behavioural Outcomes in Year 9: Comparisons of Relative Effect Sizes (Original data)

Comparisons of Relative Effect Sizes (in Absolute Values) of Significant Predictors Views of School and Academic Self-Perceptions (Original Data)

Social/Behavioural Outcomes Predictors/ Direction of Association	Year 9: SELF-REGULATION	Year 9: PRO-SOCIAL BEHAVIOUR	Year 9: HYPERACTIVITY	Year 9: ANTI-SOCIAL BEHAVIOUR
VIEWS OF SCHOOL				
Emphasis on Learning: (+) (+) (-) (-)	0.26	0.25	0.31	0.26
Negative Behavioural Climate: (-) (-) (+) (+)	0.35	0.30	0.32	0.34
Headteacher Qualities: (+) (+) (-) (-)	0.21	0.29	0.22	0.28
School Physical Environment: (NS) (+) (NS) (-)		0.19		0.15
Valuing Pupils: (+) (+) (-) (-)	0.31	0.33	0.38	0.35
Teacher Discipline: (NS) (NS) (NS) (NS)				
School Learning Resources: (+) (+) (-) (-)	0.20	0.23	0.22	0.19
Teacher Support: (+) (+) (-) (-)	0.19	0.23	0.17	0.17
SELF-PERCEPTIONS				
Academic Self-Concept: Mathematics: (+) (+) (-) (-)	0.46	0.25	0.32	0.15
Academic Self-Concept: English: (+) (+) (-) (NS)	0.24	0.15	0.18	
Enjoyment of School: (+) (+) (-) (-)	0.46	0.39	0.38	0.30
Popularity: (NS) (NS) (NS) (NS)				
Anxiety Behaviours: (-) (NS) (+) (+)	0.15		0.16	0.15
Citizenship Values: (+) (+) (-) (-)	0.30	0.36	0.29	0.23

Note: (+) = Positive association; (-) = Negative association; (NS) = Estimate not statistically significant.

TABLE 5.2: The Inflence of Students' Views of Schools and Self-Perceptions on Social/ Behavioural Outcomes in Year 9: Comparisons of Relative Effect Sizes (Imputed data)

Comparisons of Relative Effect Sizes (in Absolute Values) of Significant Predictors Views of School and Academic Self-Perceptions (Imputed Data)

Social/Behavioural Outcomes / Predictors/ Direction of Association	Year 9: SELF-REGULATION	Year 9: PRO-SOCIAL BEHAVIOUR	Year 9: HYPERACTIVITY	Year 9: ANTI-SOCIAL BEHAVIOUR
VIEWS OF SCHOOL				
Emphasis on Learning: (+) (+) (-) (-)	0.31	0.18	0.27	0.20
Negative Behavioural Climate: (-) (-) (+) (+)	0.32	0.26	0.31	0.25
Headteacher Qualities: (NS) (+) (-) (-)		0.13	0.10	0.12
School Physical Environment: (NS) (+) (NS) (NS)		0.10		
Valuing Pupils: (+) (+) (-) (-)	0.15	0.17	0.18	0.16
Teacher Discipline: (NS) (NS) (NS) (NS)				
School Learning Resources: (+) (+) (-) (-)	0.14	0.14	0.15	0.12
Teacher Support: (+) (+) (-) (-)	0.09	0.11	0.08	0.08
SELF-PERCEPTIONS				
Academic Self-Concept: Mathematics: (+) (+) (-) (-)	0.45	0.31	0.38	0.26
Academic Self-Concept: English: (+) (+) (-) (NS)	0.31	0.23	0.27	0.20
Enjoyment of School: (+) (+) (-) (-)	0.33	0.28	0.28	0.22
Popularity: (+) (+) (NS) (NS)	0.11	0.03		
Anxiety Behaviours: (-) (NS) (+) (NS)	0.13		0.11	
Citizenship Values: (+) (+) (-) (-)	0.17	0.16	0.17	0.13

Note: (+) = Positive association; (-) = Negative association; (NS) = Estimate not statistically significant.

SECTION 6: Exploring Developmental Progress Across Key Stage 3

Although a fully-fledged longitudinal analysis exceeds the scope of the present report and will be performed and reported separately (Sammons et al., 2011c, forthcoming), in this section we start to report on the statistical associations between students' social-behavioural outcomes prior to the commencement and after the completion Key Stage 3 using value-added (VA) models and correlation analyses. We also investigate some of the individual, family, HLE, neighbourhood, and educational factors that predict developmental progress across Key Stage 3 using contextual value-added (CVA) models. A structural equations confirmatory factor analysis (SEM CFA) measurement model, similar to the one used for social-behavioural outcomes in Year 9 and described in Section 2, was also employed for deriving corresponding outcomes in Year 6, prior to conducting these analyses.

Section 6.1: Statistical Associations between Pre- and Post- Key Stage 3 Levels of Social-behavioural Outcomes

Generally, prior levels of social-behavioural outcomes at Year 6 were highly predictive of Year 9 levels, as we might expect (Tables and Figures 6.1.1 - 6.1.4).

For self-regulation there are a few cases where spectacular improvements appear to have been produced across Key Stage 3 (students previously positioned at below one standard deviation from the sample average at Year 6 rise to above one standard deviation by the end of Year 9). The opposite phenomenon can be observed as well: students with previously high scores (in the range of 110-120 points on the standardised scale, i.e. around one standard deviation above the mean) in Year 6 declined to only 70-80 (more than one standard deviation below the mean) by the end of Year 9.

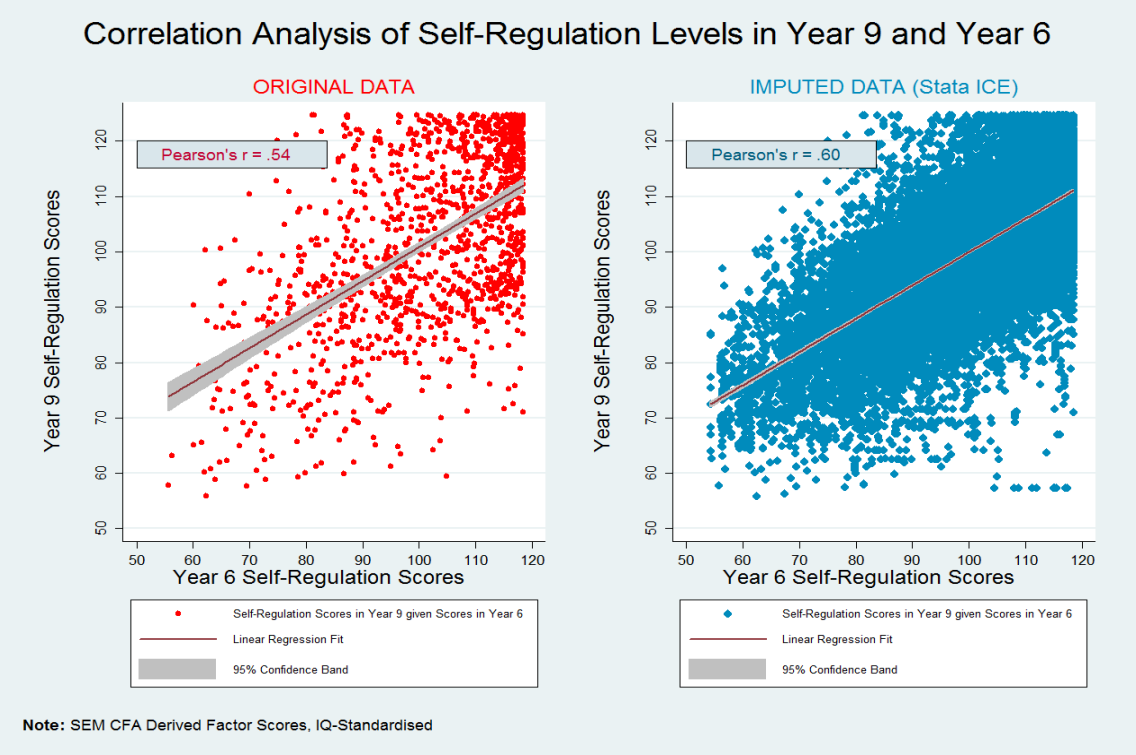
In contrast to the pattern observed for self-regulation, more systematic associations with prior levels were found at low levels of hyperactivity, and more change across Key Stage 3 at high levels of hyperactivity. Accordingly, some students with very low levels of hyperactivity in Year 6 (80 points, i.e. 1.33 standard deviations below average) received scores above one standard deviation above average in Year 9. The scatterplot diagram for anti-social behaviour (Figure 6.1.4) shows less data points in lower right quadrant (corresponding to high scores in year 6, low scores in year 9) compared to other quadrants, suggesting that increases rather than decreases in anti-social behaviour were more prevalent during key Stage 3. Further, many students with previously low levels of anti-social behaviour appear to have started to engage in behaviours such as lying, cheating, bullying in Year 9, occasionally reaching abnormal levels (up to 4 standard deviations above the mean). This is consistent with previous research showing that levels of anti-social behaviour tend to increase during adolescence. Some of these apparent variations in the levels of social-behavioural outcomes across Key Stage 3 could alternatively be construed as regression to the mean.

We find that there is more variation between secondary schools for self regulation and pro-social behaviour than for the two negative behavioural outcomes when we study developmental change across KS3 (see Tables 6.1.1-6.1.3).

TABLE 6.1.1: Value-Added Model for Self-Regulation

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Value-Added Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Year 6 Self-Regulation: SEM CFA Derived Latent Factor, IQ-Standardized	0.558	***	0.024	1.38	0.600	***	0.016	1.54
Intercept	44.068	***	2.485		40.057	***	1.575	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.260	***	1.852		7.257	***	0.947	
Variance (Level 1)	146.439	***	3.199		136.442	***	1.996	
Total Variance	156.699				143.699			
Number of Level-1 Observations	1258				2930			
Number of Level-2 Units	402				775			
Deviance (-2 x Log Restricted-Likelihood)	9917.78				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.065				0.051			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	30.00				34.76			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	35.90				55.30			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	30.42				36.24			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

FIGURE 6.1.1: Correlation Analysis of Self-Regulation Levels in Year 9 and Year 6

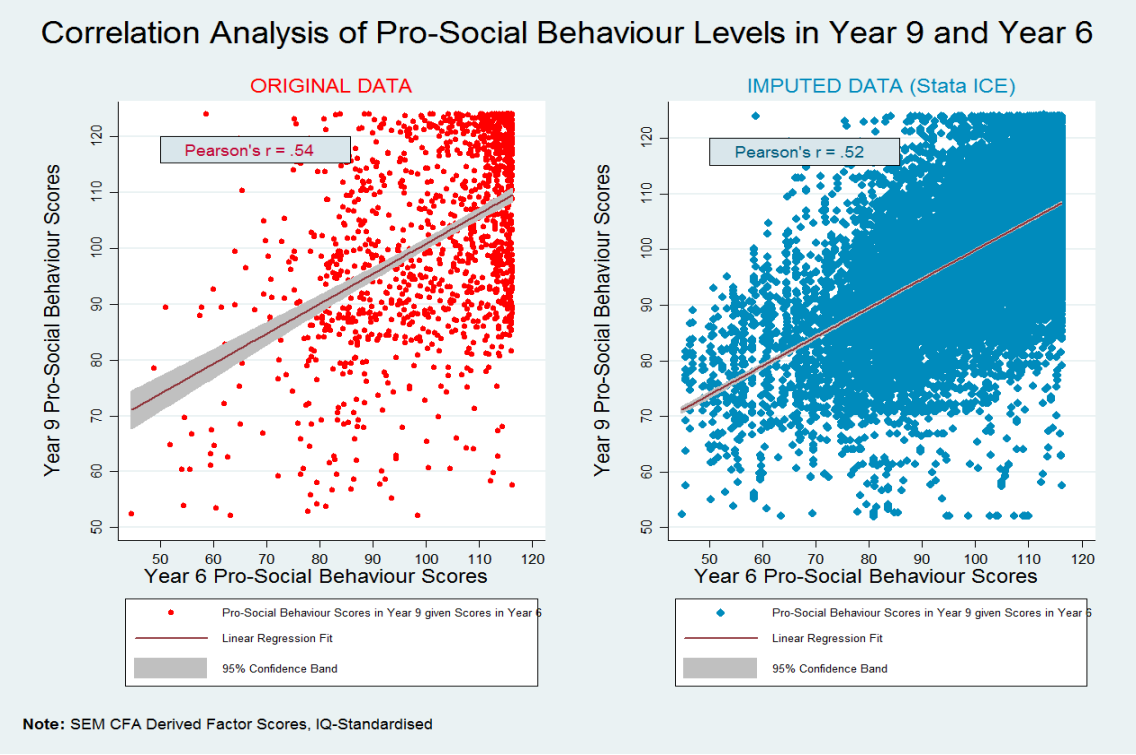


Note: SEM CFA Derived Factor Scores, IQ-Standardised

TABLE 6.1.2: Value-Added Model for Pro-Social Behaviour

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Value Added Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Year 6 Pro-Social Behaviour: SEM CFA Derived Latent Factor, IQ-Standardized	0.486	***	0.026	1.14	0.520	***	0.016	1.25
Intercept	51.242	***	2.656		48.121	***	1.643	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.626	***	2.317		8.232	***	1.128	
Variance (Level 1)	164.245	***	3.632		155.668	***	2.218	
Total Variance	177.871				163.900			
Number of Level-1 Observations	1258				2930			
Number of Level-2 Units	402				775			
Deviance (-2 x Log Restricted-Likelihood)	10072.57				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.077				0.050			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	21.05				25.89			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	22.67				47.04			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	21.18				27.35			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

FIGURE 6.1.2: Correlation Analysis of Pro-Social Behaviour Levels in Year 9 and Year 6

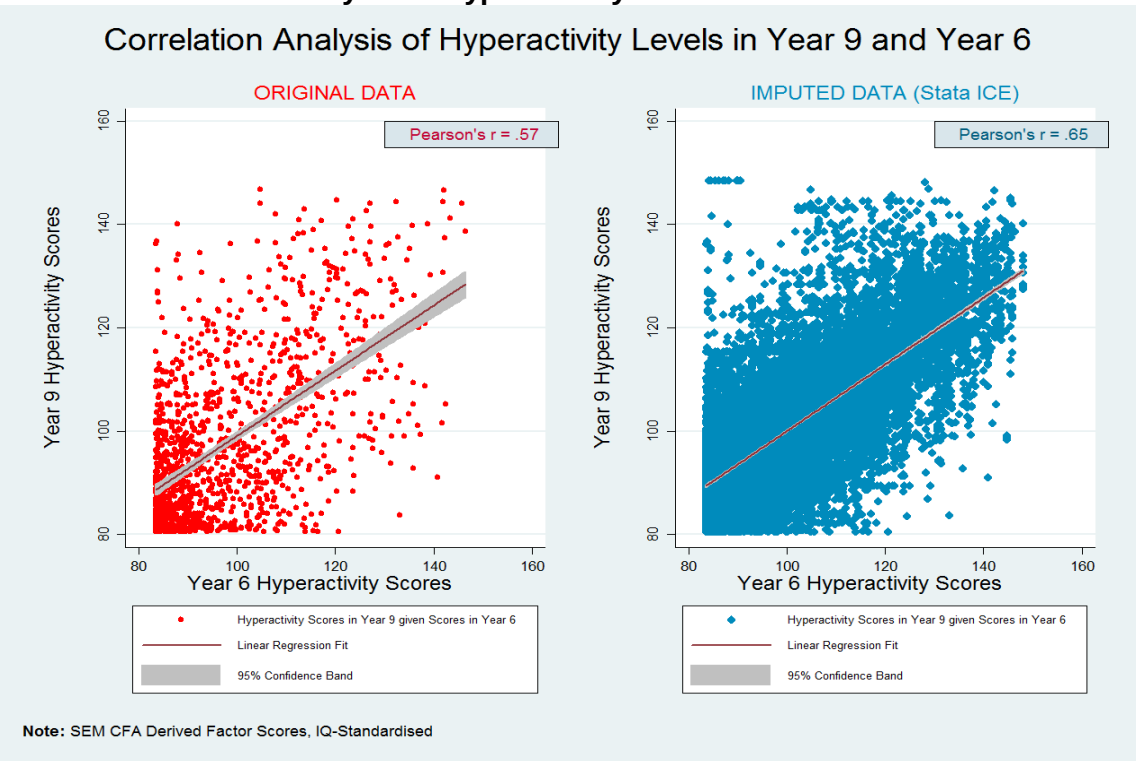


Note: SEM CFA Derived Factor Scores, IQ-Standardised

TABLE 6.1.3: Value-Added Model for Hyperactivity

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Value Added Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Year 6 Hyperactivity: SEM CFA Derived Latent Factor, IQ-Standardized	0.588	***	0.024	1.51	0.645	***	0.015	1.73
Intercept	41.389	***	2.382		35.435	***	1.553	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.540	***	1.688		5.873	***	0.816	
Variance (Level 1)	137.129	***	2.983		125.639	***	1.941	
Total Variance	146.669				131.511			
Number of Level-1 Observations	1258				2930			
Number of Level-2 Units	402				775			
Deviance (-2 x Log Restricted-Likelihood)	9834.84				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.065				0.045			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	34.32				40.60			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	41.85				57.73			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	34.87				41.65			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

FIGURE 6.1.3: Correlation Analysis of Hyperactivity Levels in Year 9 and Year 6

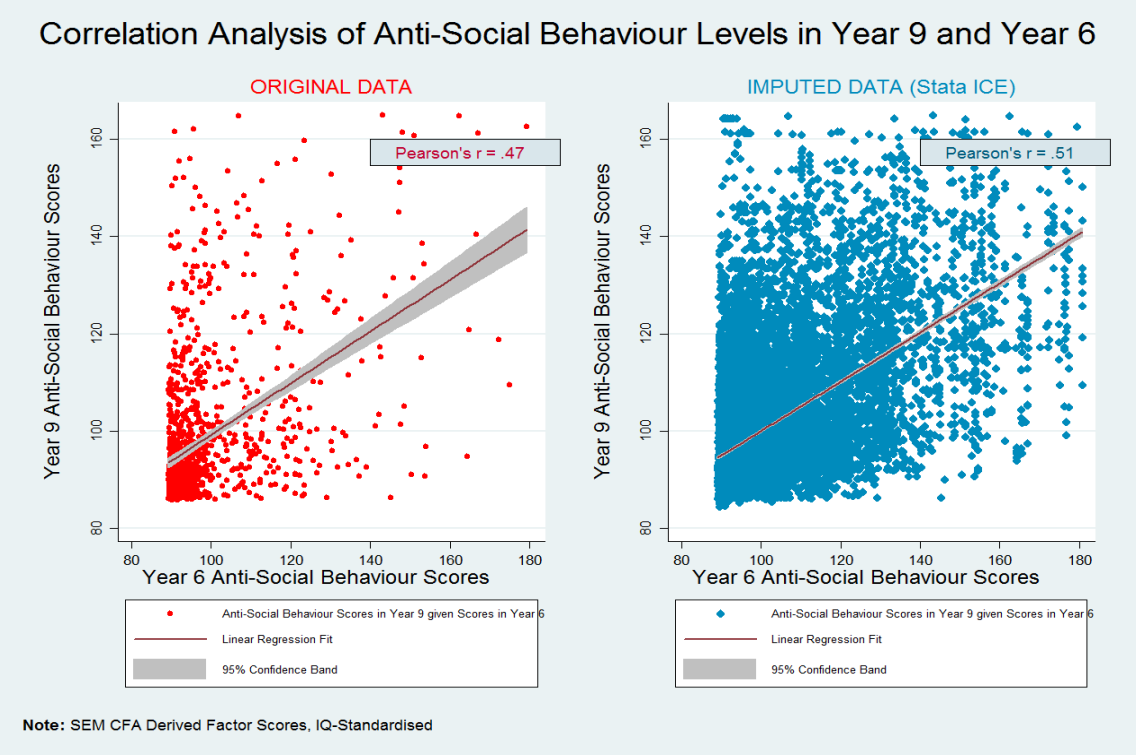


Note: SEM CFA Derived Factor Scores, IQ-Standardised

TABLE 6.1.4: Value-Added Model for Anti-Social Behaviour

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Value Added Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Year 6 Anti-Social Behaviour: SEM CFA Derived Latent Factor, IQ-Standardized	0.506	***	0.027	1.17	0.505	***	0.020	1.19
Intercept	49.805	***	2.707		49.462	***	2.041	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	6.106	***	1.798		6.362	***	1.109	
Variance (Level 1)	166.759	***	3.627		160.697	***	2.768	
Total Variance	172.865				167.059			
Number of Level-1 Observations	1258				2930			
Number of Level-2 Units	402				775			
Deviance (-2 x Log Restricted-Likelihood)	10050.45				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.035				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	21.19				24.70			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	55.56				46.73			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	23.28				25.87			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

FIGURE 6.1.4: Correlation Analysis of Anti-Social Behaviour Levels in Year 9 and Year 6



Note: SEM CFA Derived Factor Scores, IQ-Standardised

Section 6.2: Factors Associated with Developmental Progress Across Key Stage 3

Section 6.2.1: The Influence of Individual Background Factors, Family Factors, and Home Learning Environment on Developmental Progress Across Key Stage 3

Individual Factors

Gender. As the analyses reported in Section 3 indicated, female students show more favourable social-behavioural outcomes in Year 9, all other things being equal. Additionally, the contextual value-added models reported in this section reveal that assuming otherwise similar socio-demographic circumstances girls tend to show more progress in terms of self-regulation and pro-social behaviour across KS3, and at the same time a greater reduction in hyperactivity and anti-social behaviour. An implication is that the gender gap has widened during KS3.

Age. Students' relative age position within their cohort was not significantly associated with their developmental progress across KS3 for any of the investigated social-behavioural outcomes, on either original or imputed data. Thus, while younger students' levels of self-regulation and pro-social behaviour were on average lower in Year 9, whereas their levels of hyperactivity tended to be higher (see Section 3)[24], they showed similar developmental progress from Year 6 as the older cohort members.

Behavioural Problems. Students' behavioural history in early childhood was generally a good predictor of their ability to make developmental progress between KS2 and KS3 in all four investigated behavioural domains. Thus, students whose parents reported one or several behavioural problems during early childhood tended to make less developmental progress between Year 6 and Year 9. The estimates do not reach statistical significance at conventional levels in all cases, but they are all in the expected direction, indicating that the occurrence of behavioural problems in early childhood is, all else equal, associated with poorer developmental progress in terms of self-regulation and pro-social behaviour, and increased hyperactivity and anti-social behaviour across KS3.

Family Factors

Family Size. The number of siblings in the student's household was not systematically related to their developmental progress across KS3, although in the case of pro-social behaviour a certain tendency for students with one sibling to make more progress (all other things being equal) emerges on the non-imputed data.

Family Highest Socio-economic Status (SES). Significant differences in developmental progress across KS3 were predicted by family socioeconomic status especially for self-regulation. Thus, as Table 6.2.1.1 indicates, students of parents in skilled non-manual and professional non-manual occupational categories show significantly more improvements in their self-regulation abilities from Year 6 to Year 9 compared to students of unemployed parents (effect sizes range between ES=0.15 and ES=0.28 on the imputed data). Since students from families with lower SES had already started from lower levels, these findings support the notion that the equity gap in terms of self-regulation has been broadened during KS3. However the data do not offer any conclusive evidence of a similar equity gap for the other three investigated social-behavioural outcomes. With respect to pro-social behaviour, significant progress differences were only found between the extreme SES categories, and exclusively on the imputed data, with students of unemployed parents making significantly less progress compared to students of parents in professional non-manual occupations (ES=0.22). As regards the negative social-behavioural outcomes, no socio-economic group displayed any significant differences in terms of developmental progress for 'hyperactivity' or 'anti-social' behaviour during KS3 (in comparison to the reference category consisting of students whose parents are unemployed).

[24] Estimates exclsuively significant on the imputed data.

Mothers' Highest Qualifications Level. Educational qualifications held by their mothers were not only predictive of the students' levels of self-regulation in Year 9, but also of the extent to which those students had progressed from Year 6 to Year 9. Accordingly, students of mothers holding an 18 year academic degree, a degree or equivalent, or a higher degree, showed a significant increase in their levels of self-regulation across KS3 compared to students of mothers with no educational qualifications. Effect sizes corresponding to these predicted differences in terms of self-regulation progress (while controlling for other relevant factors) increase from ES=0.15 to ES=0.31 (imputed data), commensurately with the level of maternal educational qualifications. A similar pattern of differences in the progress made by students in terms of pro-social behaviour could also be identified, although in contrast to self-regulation, students of mothers holding a higher degree did not appears to make more progress than students of mothers holding only a degree or equivalent on the imputed data. Coupled with previous results from EPPSE research, these findings suggest that inequalities between students of different family backgrounds have sharpened during KS3, with students of mothers holding lower educational qualifications starting from lower levels and making significantly less progress in terms of self-regulation and pro-social behaviour. In contrast, maternal educational qualifications were not significantly related to reductions or increases in hyperactivity from Year 6 to Year 9. A possible explanation could be that hyperactivity and inattention are to a larger extent determined by genetic (as opposed to socialisation) factors, which are more difficult to mitigate even by higher educated mothers. Conversely, maternal educational qualifications were significantly associated with diminished levels of anti-social behaviour across KS3 on both original and imputed data. Thus, students of mothers holding a degree or equivalent, or a higher degree, displayed significant reductions in anti-social behaviour compared to students of mothers with no qualifications (ES=-0.30 and ES=-0.37 on the original data; ES=-0.27 and ES=-0.28 on the imputed data).

Marital Status of Parents. Family structure as indicated by the marital status of the parents did not predict progress in terms of self-regulation or pro-social behaviour across KS3. It did however significantly predict increases in the negative social-behavioural outcomes. Thus, students living in lone parent families tended on average to show higher increases in hyperactivity from Year 6 to Year 9 compared to students from families consisting of a married couple (ES=0.29 on the original data, ES=0.15 on the imputed data). Lone parenthood was also significantly associated with increases in anti-social behaviour across KS3 (ES=0.21 on the original data, ES=0.13 on the imputed data). Students from families with separated or divorced parents also displayed significant tendencies to become more anti-social during KS3.

Home Learning Environment

The quality of the early years HLE did not only have a significant long-term impact on the level of social-behavioural outcomes in year 9, but it was also highly predictive of students' abilities to make developmental progress from year 6. A high or very high quality of the early years HLE (index values in the range of 25-32 or 33-45) was significantly associated with improvements in students' self-regulatory capabilities across KS3 (on the imputed data, corresponding effect sizes are ES=0.20 for high quality, and ES=0.32 for very high quality, respectively). A broadly similar pattern could be identified for progress in the pro-social behaviour domain, although the predicted differences in terms of progress between students who have benefited from very high as opposed to those with very low quality of the early years HLE were less prominent. Significant reductions in hyperactivity across KS3 were found for students who had access to high and very high quality of HLE during early childhood. Conversely, the quality of the early years HLE did not appear to have any significant long-term impact in reducing anti-social behaviour from year 6 to year 9.

TABLE 6.2.1.1: The influence of individual background, family factors, and home learning environment on changes in self-regulation across KS3 (contextual value-added model)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Contextual Value Added Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	2.066	**	0.829	0.18	2.257	***	0.533	0.20
Age within cohort	0.051		0.126	0.03	0.101		0.071	0.06
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<=1500g)	5.482		3.619	0.48	0.243		2.043	0.02
Low birth weight, i.e. 1501-2500 g	-2.592		1.703	-0.23	-0.076		0.939	-0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	1.725		1.201	0.15	0.606		0.813	0.05
2 Siblings	0.875		1.344	0.08	0.028		0.802	0.00
3+ Siblings	0.594		1.581	0.05	-0.500		0.958	-0.04
Ethnicity: Ref = White UK heritage								
White European heritage	2.392		2.393	0.21	1.105		1.332	0.10
Black Caribbean heritage	1.446		2.877	0.13	-0.023		1.362	-0.00
Black African heritage	-0.619		3.321	-0.05	-1.303		1.698	-0.11
Any other ethnic minority	-1.191		3.546	-0.10	0.934		1.602	0.08
Indian heritage	3.886		3.270	0.34	2.770	*	1.670	0.24
Pakistani heritage	-1.001		2.450	-0.09	-0.444		1.168	-0.04
Bangladeshi heritage	-0.252		4.560	-0.02	2.638		2.318	0.23
Mixed race	-0.382		1.710	-0.03	-0.302		1.022	-0.03
Child's Behav Hist Ref No Behav Probs								
1 Behavioural Problem	-2.632	**	1.313	-0.23	-2.163	***	0.795	-0.19
2+ Behavioural Problems	-4.713	*	2.545	-0.41	-2.211		1.695	-0.19
Parents' Highest SES KS2 Ref = Unempyd/Not working								
Unskilled	1.987		3.025	0.17	-0.442		1.862	-0.04
Semi-Skilled	-1.327		1.877	-0.12	-0.913		1.063	-0.08
Skilled Manual	-0.809		1.735	-0.07	0.570		0.894	0.05
Skilled, Non-Manual	2.988	*	1.618	0.26	2.173	***	0.831	0.19
Other Professional, Non-Manual	0.895		1.510	0.08	1.765	**	0.831	0.15
Professional, Non-Manual	2.597		1.874	0.23	3.175	***	1.101	0.28
Mother's Highest Qual E Yrs: Ref None								
Other professional/ Misc.	-2.760		3.115	-0.24	-0.500		1.984	-0.04
Vocational	-1.379		1.517	-0.12	0.496		0.821	0.04
16 academic	-0.580		1.340	-0.05	0.384		0.714	0.03
18 academic	1.256		1.803	0.11	1.732	*	1.022	0.15
Degree or equivalent	1.779		1.704	0.16	2.635	**	1.063	0.23
Higher degree	4.539	**	2.225	0.40	3.538	**	1.447	0.31
Marital Status of Parent Ref = Married								
Single	-1.544		1.319	-0.13	-0.759		0.777	-0.07
Separated/Divorced	0.476		1.777	0.04	-0.252		1.057	-0.02
Living with partner	-0.261		1.290	-0.02	-1.220		0.823	-0.11
Widow/ widower	0.458		3.915	0.04	0.178		2.530	0.02
Early Years HLE (Grouped): Ref = 0-13								
Index Values: 14-19	1.135		1.732	0.10	0.996		0.869	0.09
Index Values: 20-24	1.005		1.791	0.09	1.249		0.891	0.11
Index Values: 25-32	2.166		1.743	0.19	2.251	**	0.893	0.20
Index Values: 33-45	3.436	*	1.958	0.30	3.669	***	1.048	0.32
Year 6 Self-Regulation: SEM CFA Derived Latent Factor, IQ-Standardized	0.480	***	0.031	1.26	0.520	***	0.018	1.36
Intercept	47.888	***	3.705		43.378	***	2.058	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.304	***	2.055		5.477	***	0.825	
Variance (Level 1)	131.518	***	3.447		131.773	***	1.937	
Total Variance	139.822				137.249			
Number of Level-1 Observations	954				2930			
Number of Level-2 Units	342				775			
Deviance (-2 x Log Restricted-Likelihd)	7276.97				.			
(VPC)/ Intra-Class Correlation (ICC)	0.059				0.040			
% of Level-1 Variance Reduction Compared to Null Model	37.14				36.99			
% of Level-2 Variance Reduction	48.12				66.27			
Proportion of Total Variance Reduction	37.92				39.10			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.1.2: The influence of individual background, family factors, and HLE on changes in pro-social behaviour levels across KS3 (contextual value-added model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Contextual Value Added Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	3.648	***	0.878	0.31	4.195	***	0.572	0.34
Age within cohort	0.076		0.132	0.04	0.112		0.080	0.06
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (<1500g)	6.509	*	3.791	0.54	0.773		2.329	0.06
Low birth weight (1501-2500g)	-0.355		1.784	-0.03	0.065		0.954	0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	2.186	*	1.257	0.18	0.634		0.852	0.05
2 Siblings	1.026		1.408	0.09	-0.179		0.899	-0.01
3+ Siblings	0.888		1.657	0.07	-0.739		1.051	-0.06
Ethnicity: Ref = White UK heritage								
White European heritage	0.046		2.506	0.00	0.545		1.347	0.04
Black Caribbean heritage	-1.390		3.028	-0.12	0.358		1.460	0.03
Black African heritage	2.540		3.496	0.21	-0.332		1.821	-0.03
Any other ethnic minority	0.713		3.720	0.06	0.743		1.551	0.06
Indian heritage	0.091		3.437	0.01	1.570		1.706	0.13
Pakistani heritage	-1.408		2.580	-0.12	-0.568		1.249	-0.05
Bangladeshi heritage	-0.569		4.776	-0.05	3.699		2.502	0.30
Mixed race	-2.123		1.793	-0.18	-0.426		1.124	-0.03
Child's Behav History: Ref = No Behavioural Problems								
1 Behavioural Problem	-1.764		1.378	-0.15	-2.165	***	0.827	-0.18
2+ Behavioural Problems	-2.760		2.665	-0.23	-1.223		1.758	-0.10
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.470		3.168	-0.04	-1.572		2.022	-0.13
Semi-Skilled	-2.113		1.967	-0.18	-1.333		1.058	-0.11
Skilled Manual	-1.025		1.820	-0.09	0.594		0.960	0.05
Skilled, Non-Manual	1.442		1.695	0.12	1.399		0.900	0.11
Other Professional, Non-Manual	0.504		1.582	0.04	1.489		0.918	0.12
Professional, Non-Manual	1.963		1.964	0.16	2.692	**	1.217	0.22
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	-3.648		3.262	-0.31	-1.149		2.139	-0.09
Vocational	-1.338		1.593	-0.11	-0.031		0.894	-0.00
16 academic	0.441		1.401	0.04	0.949		0.698	0.08
18 academic	2.617		1.881	0.22	1.998	*	1.055	0.16
Degree or equivalent	2.700		1.774	0.23	3.010	***	1.012	0.25
Higher degree	4.852	**	2.326	0.41	3.158	**	1.518	0.26
Marital Status of Parent Ref = Married								
Single	-1.225		1.380	-0.10	-0.722		0.831	-0.06
Separated/Divorced	-1.742		1.861	-0.15	-1.171		1.170	-0.10
Living with partner	-0.020		1.352	-0.00	-1.035		0.834	-0.08
Widow/ widower	4.768		4.112	0.40	0.624		2.593	0.05
Early Years HL Environment (Grouped): Ref = 0-13								
Index Values: 14-19	2.676		1.815	0.22	1.010		1.010	0.08
Index Values: 20-24	1.357		1.876	0.11	0.620		1.002	0.05
Index Values: 25-32	3.393	*	1.824	0.28	2.449	**	0.983	0.20
Index Values: 33-45	3.090		2.048	0.26	2.700	**	1.211	0.22
Year 6 Pro-Social Behaviour	0.424	***	0.032	1.06	0.436	***	0.017	1.07
Intercept	51.633	***	3.920		51.342	***	2.138	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.670	***	2.537		6.448	***	0.961	
Variance (Level 1)	142.831	***	3.805		148.460	***	2.148	
Total Variance	154.501				154.908			
Number of Level-1 Observations	954				2930			
Number of Level-2 Units	342				775			
Deviance (-2 x Log Restricted-Likehd)	7364.51				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.076				0.042			
% of Level-1 Variance Reduction [Compared to Null Model]	31.34				29.32			
%of Level-2 Variance Reduction	33.77				58.52			
% of Total Variance Reduction	31.53				31.33			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.1.3: The influence of individual background, family factors, and HLE on changes in hyperactivity levels across KS3 (contextual value-added model)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Contextual Value Added Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-2.138	***	0.806	-0.19	-1.839	***	0.472	-0.17
Age within cohort	0.043		0.121	0.02	-0.024		0.071	-0.01
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<1500 g)	-4.221		3.479	-0.38	0.081		1.893	0.01
Low birth weight (1501-2500)g	1.755		1.636	0.16	-0.215		0.904	-0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.505		1.153	-0.05	-0.709		0.754	-0.06
2 Siblings	0.064		1.291	0.01	-0.318		0.768	-0.03
3+ Siblings	1.256		1.518	0.11	0.695		0.883	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	-1.931		2.295	-0.17	-0.939		1.303	-0.08
Black Caribbean heritage	0.135		2.746	0.01	-0.330		1.291	-0.03
Black African heritage	1.047		3.166	0.09	1.099		1.650	0.10
Any other ethnic minority	0.049		3.400	0.00	-1.016		1.537	-0.09
Indian heritage	-5.720	*	3.126	-0.51	-1.875		1.678	-0.17
Pakistani heritage	2.177		2.334	0.20	0.138		1.110	0.01
Bangladeshi heritage	-3.470		4.370	-0.31	-3.313		2.216	-0.30
Mixed race	0.485		1.640	0.04	0.054		1.020	0.00
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.913		1.262	0.17	2.379	***	0.760	0.22
2+ Behavioural Problems	5.575	**	2.441	0.50	3.126	*	1.607	0.28
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.173		2.907	-0.02	2.522		1.807	0.23
Semi-Skilled	3.411	*	1.801	0.31	2.192	**	0.921	0.20
Skilled Manual	2.391		1.664	0.21	-0.225		0.876	-0.02
Skilled, Non-Manual	-0.539		1.552	-0.05	-1.120		0.841	-0.10
Other Professional, Non-Manual	0.719		1.447	0.06	-1.021		0.801	-0.09
Professional, Non-Manual	0.427		1.796	0.04	-1.152		1.051	-0.10
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	5.231	*	2.990	0.47	1.708		1.867	0.15
Vocational	0.783		1.454	0.07	-0.316		0.798	-0.03
16 academic	0.605		1.284	0.05	0.214		0.652	0.02
18 academic	-0.746		1.723	-0.07	-0.912		0.949	-0.08
Degree or equivalent	-0.900		1.626	-0.08	-1.570		0.959	-0.14
Higher degree	-3.294		2.125	-0.30	-1.928		1.334	-0.17
Marital Status of Parent Ref = Married								
Single	3.179	**	1.263	0.29	1.702	**	0.785	0.15
Separated/Divorced	1.242		1.708	0.11	1.596		1.017	0.14
Living with partner	-0.021		1.240	-0.00	1.390		0.988	0.13
Widow/ widower	2.123		3.751	0.19	-0.422		2.660	-0.04
Early Years HLE(Grouped): Ref = 0-13								
Index Values: 14-19	-0.003		1.663	-0.00	-0.233		0.867	-0.02
Index Values: 20-24	-0.595		1.722	-0.05	-0.437		0.842	-0.04
Index Values: 25-32	-1.512		1.672	-0.14	-1.418	*	0.859	-0.13
Index Values: 33-45	-1.712		1.879	-0.15	-2.246	**	1.043	-0.20
Year 6 Hyperactivity	0.522	***	0.031	1.41	0.581	***	0.017	1.58
Intercept	47.825	***	4.032		43.903	***	2.383	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.197	**	1.527		5.190	***	0.778	
Variance (Level 1)	123.696	***	3.162		122.020	***	1.870	
Total Variance	127.893				127.210			
Number of Level-1 Observations	954				2930			
Number of Level-2 Units	342				775			
Deviance (-2 x Log Restricted-Likelihd)	7200.26				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.033				0.041			
% of Level-1 Variance Reduction [Compared to Null Model]	40.75				42.31			
% of Level-2 Variance Reduction	74.42				62.64			
% of Total Variance Reduction	43.21				43.56			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.1.4: The influence of individual background, family factors, and home learning environment on changes in anti-social behaviour levels across KS3 (contextual value-added model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Contextual Value Added Model 1								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.916	**	0.798	-0.17	-2.536	***	0.618	-0.20
Age within cohort	0.154		0.123	0.08	-0.009		0.081	-0.00
Birth weight: Ref = Normal (> 2500g)								
Foetal infant/very low weight (1500 g)	-2.547		3.555	-0.22	1.355		2.262	0.11
Low birth weight (1501-2500 g)	2.196		1.670	0.19	1.092		1.118	0.09
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.005		1.174	-0.09	-0.695		0.825	-0.06
2 Siblings	0.321		1.316	0.03	0.038		0.949	0.00
3+ Siblings	2.250		1.549	0.20	1.437		1.185	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	-1.396		2.341	-0.12	-0.127		1.461	-0.01
Black Caribbean heritage	-0.535		2.787	-0.05	-1.196		1.438	-0.10
Black African heritage	0.355		3.202	0.03	1.782		2.154	0.14
Any other ethnic minority	0.214		3.464	0.02	0.237		1.845	0.02
Indian heritage	-3.932		3.174	-0.34	-0.345		1.882	-0.03
Pakistani heritage	-0.417		2.355	-0.04	-0.586		1.347	-0.05
Bangladeshi heritage	-3.924		4.447	-0.34	-2.931		2.576	-0.24
Mixed race	0.905		1.671	0.08	0.952		1.340	0.08
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	0.336		1.286	0.03	2.582	***	0.914	0.21
2+ Behavioural Problems	3.481		2.488	0.30	3.331	*	1.848	0.27
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.143		2.973	0.10	3.810	*	2.123	0.31
Semi-Skilled	3.890	**	1.833	0.34	1.477		1.087	0.12
Skilled Manual	2.660		1.695	0.23	-0.427		1.096	-0.03
Skilled, Non-Manual	0.248		1.583	0.02	-1.558		0.965	-0.13
Other Professional, Non-Manual	2.199		1.479	0.19	-0.730		0.941	-0.06
Professional, Non-Manual	1.674		1.832	0.15	-1.418		1.259	-0.11
Mother's Highest Qualifications Level: Early Yrs Ref = None								
Other professional/ Misc.	5.790	*	3.047	0.50	2.128		2.185	0.17
Vocational	0.955		1.479	0.08	-0.196		0.941	-0.02
16 academic	-1.274		1.305	-0.11	-0.608		0.828	-0.05
18 academic	-2.007		1.749	-0.17	-1.715		1.196	-0.14
Degree or equivalent	-3.496	**	1.642	-0.30	-3.335	***	1.118	-0.27
Higher degree	-4.252	**	2.152	-0.37	-3.445	**	1.575	-0.28
Marital Status of Parent Ref = Married								
Single	2.413	*	1.282	0.21	1.632	*	0.866	0.13
Separated/Divorced	3.166	*	1.745	0.27	1.961	*	1.138	0.16
Living with partner	0.591		1.262	0.05	1.510		0.971	0.12
Widow/ widower	0.085		3.817	0.01	-1.219		2.706	-0.10
Early Years HLE (Grouped): Ref = 0-13								
Index Values: 14-19	0.180		1.697	0.02	0.334		1.215	0.03
Index Values: 20-24	-1.248		1.756	-0.11	0.373		1.227	0.03
Index Values: 25-32	-1.753		1.701	-0.15	-0.795		1.200	-0.06
Index Values: 33-45	-1.061		1.910	-0.09	-0.755		1.512	-0.06
Year 6 Anti-Social Behaviour	0.485	***	0.033	1.26	0.448	***	0.021	1.08
Intercept	51.925	***	4.138		57.202	***	2.559	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000	***	0.000		5.302	***	0.983	
Variance (Level 1)	132.572	***	3.099		155.005	***	2.722	
Total Variance	132.572				160.307			
Number of Level-1 Observations	954				2930			
Number of Level-2 Units	342				775			
Deviance (-2 x Log Restricted-Likehdd)	7235.86				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.033			
% of Level-1 Variance Reduction	37.34				27.37			
% of Level-2 Variance Reduction	100.00				55.61			
% of Total Variance Reduction	41.16				28.87			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Section 6.2.2: The Influence of Educational Environments on Developmental Progress Across Key Stage 3

TABLE 6.2.2: The influence of secondary school quality (Ofsted) on changes in pro-social behaviour levels across KS3 (Contextual Value-Added Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Contextual Value Added Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	3.536	***	0.981	0.29	4.152	***	0.619	0.34
Age within cohort	0.143		0.148	0.07	0.123		0.087	0.06
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight(<1500g)	8.037	**	4.063	0.66	1.462		2.474	0.12
Low birth weight (1501-2500 g)	0.318		1.978	0.03	0.298		1.053	0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	2.299		1.410	0.19	0.499		0.972	0.04
2 Siblings	1.357		1.580	0.11	-0.213		1.001	-0.02
3+ Siblings	1.125		1.862	0.09	-1.076		1.207	-0.09
Ethnicity: Ref = White UK heritage								
White European heritage	-1.471		2.902	-0.12	-0.029		1.629	-0.00
Black Caribbean heritage	-3.375		3.345	-0.28	-0.069		1.567	-0.01
Black African heritage	3.593		3.867	0.30	-0.745		2.048	-0.06
Any other ethnic minority	0.077		4.164	0.01	0.796		1.756	0.06
Indian heritage	-1.266		3.643	-0.10	0.958		1.849	0.08
Pakistani heritage	-2.107		2.855	-0.17	-1.298		1.387	-0.10
Bangladeshi heritage	0.978		5.759	0.08	5.691	*	3.039	0.46
Mixed race	-1.965		2.028	-0.16	-0.663		1.230	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-1.150		1.506	-0.09	-2.107	**	0.933	-0.17
2+ Behavioural Problems	-5.754	*	3.369	-0.47	-0.883		1.994	-0.07
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.200		3.412	-0.02	-1.415		2.117	-0.11
Semi-Skilled	-1.416		2.158	-0.12	-1.334		1.187	-0.11
Skilled Manual	-0.566		1.955	-0.05	0.715		1.023	0.06
Skilled, Non-Manual	2.869		1.826	0.24	2.262	**	0.994	0.18
Other Professional, Non-Manual	1.050		1.719	0.09	1.679	*	0.991	0.14
Professional, Non-Manual	3.120		2.270	0.26	3.432	**	1.405	0.28
Mother's Highest Qualification Early Yrs: Ref = None								
Other professional/ Misc.	-4.292		3.601	-0.35	-2.052		2.327	-0.17
Vocational	-1.541		1.697	-0.13	-0.223		0.962	-0.02
16 academic	0.622		1.496	0.05	0.753		0.753	0.06
18 academic	3.027		2.054	0.25	1.684		1.201	0.14
Degree or equivalent	2.096		2.009	0.17	2.729	**	1.185	0.22
Higher degree	4.992	*	2.940	0.41	3.574	*	1.988	0.29
Marital Status of Parent Ref Married								
Single	-1.315		1.499	-0.11	-0.871		0.948	-0.07
Separated/Divorced	-2.563		1.997	-0.21	-1.603		1.258	-0.13
Living with partner	0.489		1.480	0.04	-0.961		0.937	-0.08
Widow/ widower	9.228	*	4.713	0.76	1.344		2.797	0.11
Early Years HLE(Grouped)Ref = 0-13								
Index Values: 14-19	2.322		1.949	0.19	0.541		1.073	0.04
Index Values: 20-24	0.006		2.025	0.00	-0.074		1.091	-0.01
Index Values: 25-32	3.005		1.971	0.25	1.983	*	1.089	0.16
Index Values: 33-45	3.306		2.251	0.27	2.785	**	1.345	0.23
Ofsted Evaluation: Behaviour of Learners: Ref = Inadequate								
Ofsted Judgment: Outstanding	8.468	*	4.868	0.70	3.494		2.360	0.28
Ofsted Judgment: Good	6.911		4.783	0.57	2.998		2.279	0.24
Ofsted Judgment: Satisfactory	7.582		4.833	0.62	3.114		2.283	0.25
Year 6 Pro-Social Behaviour	0.450	***	0.036	1.11	0.441	***	0.019	1.07
Intercept	41.168	***	6.540		48.182	***	3.144	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.487	***	2.818		6.690	***	1.057	
Variance (Level 1)	147.893	***	4.287		153.230	***	2.407	
Total Variance	158.380				159.920			
Number of Level-1 Observations	794				2451			
Number of Level-2 Units	247				525			
Deviance (-2 x Log Restricted-Likehd	6105.20				.			
Variance Partitioning Coefficient	0.066				0.042			

(VPC)/ Intra-Class Correlation (ICC)								
% of Level-1 Variance Reduction	28.91				27.05			
% of Level-2 Variance Reduction	40.48				56.97			
%of Total Variance Reduction	29.81				29.11			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Although high pre-school quality (top 20 percentiles) as measured by the ECERS-R and ECERS-E observational scales has been found to have an enduring protective impact on social-behavioural outcomes in KS3, we could not identify any significant impact of pre-school quality on developmental progress from Year 6 to Year 9. Similarly, primary school academic effectiveness did not show any long-term impact on students' improvement in terms of positive behaviours or reduction in terms of negative behaviours.

By contrast, various measures of the quality and effectiveness of secondary schools were statistically significant predictors of students' developmental progress across KS3. While measures based on standardised test results (such as the KS2-KS4 CVA measure), or related to expert judgments (Ofsted inspections) were generally not significantly associated with changes in the levels of social-behavioural outcomes between Year 6 and Year 9 (with the notable exception of pro-social behaviour, see Table 6.2.2 below where EPPSE students who attended schools rated as outstanding by Ofsted in terms of the Behaviour of learners showed significant improvements in pro-social behaviour across KS3), indicators related to students' perceptions of secondary school experiences significantly predicted behavioural change.

Several major domains pertaining to teaching and school processes in secondary schools accounted for developmental progress across KS3, after allowing for influences from individual student and family background factors and the quality of the early years HLE.

Emphasis on Learning

One important domain was the Emphasis on learning. As discussed in Section 5, this factor relates to critical reasoning as opposed to short-term memorization, and the activation of higher-order cognitive processes. A strong emphasis on such aspects predicted significant improvements in students' self-regulation abilities during KS3 (ES=0.24 original data; ES=0.10 imputed data), and similar positive progress in terms of pro-social behaviour. Further, teaching processes based on prompting students to actively engage in intellectually stimulating rather than repetitive tasks were significantly related to reductions in hyperactivity levels from Year 6 to Year 9 (ES= -0.23 original data; ES= -0.12 imputed data). Levels of anti-social behaviour were also found to have decreased significantly among students who attended secondary schools where such teaching strategies were implemented ES= -0.19 original data; ES= -0.12 imputed data).

TABLE 6.2.2.1.a: The inflence of students' views of school (Emphasis on Learning) on changes in self-regulation levels across KS3 (Contextual Value-Added Model)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Emphasis on Learning								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	1.273		0.915	0.12	2.166	***	0.529	0.19
Age within cohort	0.140		0.142	0.08	0.105		0.071	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	4.668	*	2.810	0.42	1.199		1.317	0.10
Black Caribbean heritage	-0.378		3.173	-0.03	-0.094		1.348	-0.01
Black African heritage	-0.021		4.603	-0.00	-1.481		1.693	-0.13
Any other ethnic minority	-1.169		4.479	-0.11	0.938		1.587	0.08
Indian heritage	3.483		3.793	0.32	2.698		1.676	0.24
Pakistani heritage	-2.512		2.787	-0.23	-0.333		1.169	-0.03
Bangladeshi heritage	-1.566		4.829	-0.14	2.808		2.314	0.25
Mixed race	-0.086		1.892	-0.01	-0.323		1.011	-0.03
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (1500 g)	6.245		4.136	0.57	0.250		2.028	0.02
Low birth weight (1501-2500 g)	-5.476	***	2.077	-0.50	-0.053		0.936	-0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	2.013		1.330	0.18	0.606		0.819	0.05
2 Siblings	1.612		1.502	0.15	0.047		0.802	0.00
3+ Siblings	2.281		1.817	0.21	-0.471		0.951	-0.04
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.961	***	1.492	-0.36	-2.130	***	0.794	-0.19
2+ Behavioural Problems	-5.921	**	2.872	-0.54	-2.213		1.695	-0.19
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.547		3.731	0.05	-0.496		1.862	-0.04
Semi-Skilled	-0.853		2.193	-0.08	-0.903		1.072	-0.08
Skilled Manual	-0.840		1.940	-0.08	0.583		0.895	0.05
Skilled, Non-Manual	2.580		1.823	0.23	2.168	***	0.832	0.19
Other Professional, Non-Manual	0.465		1.695	0.04	1.692	**	0.839	0.15
Professional, Non-Manual	3.978	*	2.082	0.36	3.099	***	1.105	0.27
Mother's Highest Qual Early Years Ref = None								
Other professional/ Misc.	-3.763		3.407	-0.34	-0.636		1.975	-0.06
Vocational	-1.771		1.784	-0.16	0.402		0.817	0.04
16 academic	-1.007		1.574	-0.09	0.330		0.704	0.03
18 academic	-1.111		2.112	-0.10	1.598		1.017	0.14
Degree or equivalent	-0.742		1.916	-0.07	2.474	**	1.056	0.22
Higher degree	1.999		2.436	0.18	3.335	**	1.452	0.29
Marital Status of Parent Ref = Married								
Single	-0.581		1.504	-0.05	-0.730		0.789	-0.06
Separated/Divorced	0.299		2.130	0.03	-0.245		1.055	-0.02
Living with partner	-1.063		1.410	-0.10	-1.184		0.818	-0.10
Widow/ widower	-3.159		4.865	-0.29	0.072		2.542	0.01
Early Years HLE(Continuous scale)	0.178	***	0.067	0.25	0.144	***	0.034	0.19
Y9: Views of School: Emphasis on Learning Factor	8.362	***	2.764	0.24	3.608	**	1.723	0.10
Year 6 Self-Regulation	0.448	***	0.036	1.22	0.517	***	0.018	1.35
Intercept	56.819	***	4.873		44.958	***	2.406	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.710	***	2.607		5.453	***	0.819	
Variance (Level 1)	120.862	***	3.795		131.219	***	1.949	
Total Variance	132.572				136.672			
Number of Level-1 Observations	722				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelid)	5433.27				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.088				0.040			
% of Level-1 Variance Reduction [Compared to Null Model]	42.23				37.26			
% of Level-2 Variance Reduction [Compared to Null Model]	26.84				66.42			
% of Total Variance Reduction	41.14				39.36			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.1.b: The influence of students' views of school (Emphasis on Learning) on changes in pro-social behaviour levels across KS3 (Contextual Value-Added Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Emphasis on Learning								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	2.688	***	0.952	0.24	4.080	***	0.570	0.34
Age within cohort	0.216		0.146	0.12	0.113		0.080	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	1.248		2.894	0.11	0.661		1.342	0.05
Black Caribbean heritage	-2.965		3.278	-0.26	0.255		1.450	0.02
Black African heritage	5.753		4.745	0.51	-0.485		1.834	-0.04
Any other ethnic minority	0.436		4.624	0.04	0.745		1.545	0.06
Indian heritage	0.435		3.908	0.04	1.512		1.702	0.12
Pakistani heritage	-2.591		2.871	-0.23	-0.468		1.247	-0.04
Bangladeshi heritage	-1.626		4.964	-0.14	3.824		2.508	0.31
Mixed race	-1.026		1.950	-0.09	-0.468		1.120	-0.04
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<=1500g)	6.842		4.267	0.60	0.862		2.305	0.07
Low birth weight (1501-2500 g)	-3.110		2.138	-0.27	0.114		0.954	0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	2.318	*	1.369	0.20	0.681		0.846	0.06
2 Siblings	1.952		1.548	0.17	-0.109		0.906	-0.01
3+ Siblings	2.623		1.872	0.23	-0.660		1.047	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.293		1.538	-0.20	-2.170	***	0.827	-0.18
2+ Behavioural Problems	-4.201		2.961	-0.37	-1.199		1.757	-0.10
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.731		3.848	0.06	-1.632		2.022	-0.13
Semi-Skilled	0.220		2.259	0.02	-1.292		1.061	-0.11
Skilled Manual	0.446		2.000	0.04	0.630		0.954	0.05
Skilled, Non-Manual	2.456		1.880	0.22	1.399		0.906	0.11
Other Professional, Non-Manual	1.160		1.746	0.10	1.392		0.928	0.11
Professional, Non-Manual	3.870	*	2.144	0.34	2.602	**	1.229	0.21
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	-3.204		3.503	-0.28	-1.317		2.141	-0.11
Vocational	-1.258		1.843	-0.11	-0.120		0.888	-0.01
16 academic	-0.499		1.614	-0.04	0.921		0.691	0.08
18 academic	-0.452		2.167	-0.04	1.885	*	1.056	0.15
Degree or equivalent	-0.284		1.955	-0.03	2.843	***	1.019	0.23
Higher degree	2.165		2.501	0.19	2.893	*	1.519	0.24
Marital Status of Parent Ref = Married								
Single	0.570		1.549	0.05	-0.668		0.843	-0.05
Separated/Divorced	-1.691		2.196	-0.15	-1.135		1.172	-0.09
Living with partner	-1.349		1.453	-0.12	-1.013		0.832	-0.08
Widow/ widower	-3.724		5.019	-0.33	0.498		2.601	0.04
Early Years HLE (Continuous scale)	0.153	**	0.069	0.20	0.128	***	0.037	0.16
Y9: Views of School: Emphasis on Learning Factor	7.862	***	2.847	0.22	3.719	**	1.799	0.10
Year 6 Pro-Social Behaviour	0.411	***	0.036	1.08	0.433	***	0.018	1.07
Intercept	58.870	***	5.021		53.091	***	2.691	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.776	***	2.991		6.374	***	0.954	
Variance (Level 1)	128.906	***	4.144		148.107	***	2.134	
Total Variance	140.682				154.481			
Number of Level-1 Observations	722				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5474.81				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.084				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	38.04				29.49			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	33.17				58.99			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	37.66				31.52			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.1.c: The influence of students' views of school (Emphasis on Learning) on changes in hyperactivity levels across KSt3 (Contextual Value-Added Model)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Emphasis on Learning								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.598	*	0.877	-0.15	-1.744	***	0.473	-0.16
Age within cohort	-0.043		0.134	-0.03	-0.027		0.071	-0.02
Ethnicity: Ref = White UK heritage								
White European heritage	-4.936	*	2.661	-0.47	-1.015		1.287	-0.09
Black Caribbean heritage	4.381		2.995	0.41	-0.251		1.283	-0.02
Black African heritage	2.961		4.337	0.28	1.306		1.647	0.12
Any other ethnic minority	-0.508		4.242	-0.05	-1.028		1.533	-0.09
Indian heritage	-4.491		3.574	-0.42	-1.798		1.696	-0.16
Pakistani heritage	4.042		2.619	0.38	0.014		1.105	0.00
Bangladeshi heritage	-2.152		4.558	-0.20	-3.495		2.191	-0.32
Mixed race	-0.419		1.792	-0.04	0.079		1.014	0.01
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<=1500g)	-4.167		3.940	-0.39	0.044		1.892	0.00
Low birth weight (1501-2500 g)	4.627	**	1.972	0.44	-0.233		0.894	-0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.297		1.262	-0.03	-0.712		0.754	-0.06
2 Siblings	-0.427		1.425	-0.04	-0.341		0.770	-0.03
3+ Siblings	-0.016		1.723	-0.00	0.656		0.880	0.06
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.743	*	1.415	0.26	2.362	***	0.760	0.21
2+ Behavioural Problems	5.937	**	2.729	0.56	3.101	*	1.595	0.28
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.739		3.547	0.16	2.641		1.812	0.24
Semi-Skilled	0.752		2.078	0.07	2.180	**	0.922	0.20
Skilled Manual	1.559		1.839	0.15	-0.223		0.884	-0.02
Skilled, Non-Manual	-0.532		1.732	-0.05	-1.101		0.842	-0.10
Other Professional, Non-Manual	0.708		1.607	0.07	-0.925		0.809	-0.08
Professional, Non-Manual	-1.042		1.973	-0.10	-1.045		1.054	-0.09
Mother's Highest Quals Early Years: Ref = None								
Other professional/ Misc.	5.664	*	3.227	0.53	1.841		1.864	0.17
Vocational	0.774		1.695	0.07	-0.230		0.790	-0.02
16 academic	0.637		1.492	0.06	0.263		0.652	0.02
18 academic	0.480		1.998	0.05	-0.801		0.950	-0.07
Degree or equivalent	0.504		1.805	0.05	-1.421		0.963	-0.13
Higher degree	-1.879		2.300	-0.18	-1.706		1.334	-0.15
Marital Status of Parent Ref = Married								
Single	1.935		1.424	0.18	1.667	**	0.801	0.15
Separated/Divorced	0.053		2.027	0.01	1.588		1.015	0.14
Living with partner	0.160		1.341	0.02	1.368		0.985	0.12
Widow/ widower	5.305		4.607	0.50	-0.366		2.672	-0.03
Early Years HLE (Continuous scale)	-0.089		0.064	-0.13	-0.107	***	0.034	-0.15
Emphasis on Learning Factor	-7.811	***	2.626	-0.23	-4.123	**	1.666	-0.12
Year 6 Hyperactivity	0.478	***	0.035	1.35	0.577	***	0.017	1.57
Intercept	46.556	***	4.757		42.673	***	2.714	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.084	**	1.729		5.153	***	0.771	
Variance (Level 1)	112.669	***	3.373		121.439	***	1.888	
Total Variance	117.753				126.592			
Number of Level-1 Observations	722				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5358.53				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.043				0.041			
% of Level-1 Variance Reduction [Compared to Null Model]	46.03				42.58			
% of Level-2 Variance Reduction	69.01				62.91			
% of Total Variance Reduction	47.71				43.83			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.1.d: The influence of students' views of school (Emphasis on Learning) on changes in anti-social behaviour levels across KS3 (Contextual Value-Added Model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Emphasis on Learning								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-0.871		0.844	-0.08	-2.397	***	0.615	-0.19
Age within cohort	0.008		0.131	0.00	-0.010		0.081	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-4.928	*	2.616	-0.46	-0.209		1.466	-0.02
Black Caribbean heritage	2.534		2.939	0.24	-1.108		1.441	-0.09
Black African heritage	0.096		4.234	0.01	1.982		2.141	0.16
Any other ethnic minority	-1.643		4.160	-0.15	0.207		1.853	0.02
Indian heritage	-2.609		3.486	-0.25	-0.250		1.893	-0.02
Pakistani heritage	-0.073		2.549	-0.01	-0.706		1.342	-0.06
Bangladeshi heritage	-2.926		4.461	-0.28	-3.088		2.528	-0.25
Mixed race	-1.000		1.760	-0.09	0.982		1.339	0.08
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<=1500g)	-2.678		3.885	-0.25	1.266		2.261	0.10
Low birth weight (1501-2500 g)	5.183	***	1.937	0.49	1.060		1.111	0.09
Number of Siblings: Ref = No Siblings								
1 Sibling	0.429		1.240	0.04	-0.717		0.819	-0.06
2 Siblings	0.570		1.400	0.05	-0.008		0.952	-0.00
3+ Siblings	1.218		1.693	0.11	1.377		1.186	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.828		1.390	0.17	2.578	***	0.915	0.21
2+ Behavioural Problems	2.956		2.684	0.28	3.261	*	1.848	0.26
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.800		3.496	0.08	3.982	*	2.124	0.32
Semi-Skilled	0.649		2.038	0.06	1.456		1.093	0.12
Skilled Manual	1.446		1.807	0.14	-0.419		1.080	-0.03
Skilled, Non-Manual	-0.870		1.707	-0.08	-1.523		0.962	-0.12
Other Professional, Non-Manual	1.075		1.587	0.10	-0.606		0.934	-0.05
Professional, Non-Manual	-0.517		1.945	-0.05	-1.275		1.255	-0.10
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	4.492		3.161	0.42	2.282		2.173	0.18
Vocational	0.116		1.671	0.01	-0.107		0.937	-0.01
16 academic	-1.542		1.464	-0.15	-0.558		0.833	-0.04
18 academic	-0.730		1.959	-0.07	-1.614		1.192	-0.13
Degree or equivalent	-2.336		1.760	-0.22	-3.168	***	1.129	-0.25
Higher degree	-3.031		2.251	-0.28	-3.159	**	1.569	-0.25
Marital Status of Parent Ref = Married								
Single	1.165		1.393	0.11	1.582	*	0.875	0.13
Separated/Divorced	2.902		2.000	0.27	1.938	*	1.128	0.16
Living with partner	1.456		1.318	0.14	1.497		0.967	0.12
Widow/ widower	6.379		4.526	0.60	-1.187		2.686	-0.10
Early Years HLE (Continuous scale)	-0.047		0.062	-0.07	-0.070		0.047	-0.09
Emphasis on Learning Factor	-6.436	**	2.570	-0.19	-4.561	***	1.677	-0.12
Year 6 Anti-Social Behaviour	0.466	***	0.036	1.31	0.445	***	0.021	1.07
Intercept	48.354	***	4.784		55.311	***	2.945	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000	***	0.000		5.199	***	0.972	
Variance (Level 1)	113.116	***	3.056		154.514	***	2.744	
Total Variance	113.116				159.713			
Number of Level-1 Observations	722				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5333.64				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.033			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	46.54				27.60			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	100.00				56.47			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	49.80				29.13			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Teacher Support

Students whose teachers set clear expectations, exhibited supportive attitudes, and provided constructive feedback, made significantly better behavioural progress across KS3 compared to students with similar background characteristics in schools where teacher support was less favourably. Teachers support increased self-regulation and pro-social behaviour across KS3, and diminished levels of hyperactivity and anti-social behaviour.

TABLE 6.2.2.2.a: The influence of teacher support on changes in self-regulation across KS3

FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA(Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	1.648	*	0.921	0.15	2.236	***	0.527	0.20
Age within cohort	0.159		0.143	0.09	0.104		0.071	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	4.348		2.966	0.40	1.203		1.325	0.11
Black Caribbean heritage	-0.525		3.178	-0.05	-0.007		1.358	-0.00
Black African heritage	0.258		4.611	0.02	-1.353		1.691	-0.12
Any other ethnic minority	1.019		4.834	0.09	1.038		1.616	0.09
Indian heritage	3.480		3.795	0.32	2.777	*	1.679	0.24
Pakistani heritage	-2.787		2.798	-0.25	-0.353		1.171	-0.03
Bangladeshi heritage	-1.402		4.828	-0.13	2.710		2.315	0.24
Mixed race	-0.110		1.895	-0.01	-0.241		1.017	-0.02
Birth weight: Ref = Normal (> 2500 g)								
Foetal infant/very low weight (<=1500g)	5.790		4.141	0.53	0.177		2.037	0.02
Low birth weight (1501-2500 g)	-5.548	***	2.077	-0.51	-0.045		0.933	-0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.811		1.336	0.17	0.619		0.820	0.05
2 Siblings	1.750		1.511	0.16	0.064		0.802	0.01
3+ Siblings	2.339		1.827	0.21	-0.467		0.954	-0.04
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.901	**	1.551	-0.36	-2.124	***	0.791	-0.19
2+ Behavioural Problems	-6.002	**	2.872	-0.55	-2.239		1.690	-0.20
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.550		3.882	0.05	-0.523		1.863	-0.05
Semi-Skilled	-1.147		2.199	-0.10	-0.946		1.066	-0.08
Skilled Manual	-0.915		1.959	-0.08	0.567		0.897	0.05
Skilled, Non-Manual	2.641		1.855	0.24	2.168	***	0.833	0.19
Other Professional, Non-Manual	0.545		1.703	0.05	1.731	**	0.834	0.15
Professional, Non-Manual	4.176	**	2.092	0.38	3.136	***	1.101	0.27
Mother's Highest Early Yrs: Ref = None								
Other professional/ Misc.	-3.254		3.516	-0.30	-0.600		1.968	-0.05
Vocational	-2.245		1.798	-0.20	0.399		0.821	0.03
16 academic	-1.499		1.588	-0.14	0.314		0.708	0.03
18 academic	-1.513		2.127	-0.14	1.610		1.021	0.14
Degree or equivalent	-1.002		1.935	-0.09	2.469	**	1.052	0.22
Higher degree	1.702		2.447	0.16	3.370	**	1.454	0.29
Marital Status of Parent Ref = Married								
Single	-0.022		1.520	-0.00	-0.720		0.789	-0.06
Separated/Divorced	0.207		2.160	0.02	-0.224		1.056	-0.02
Living with partner	-0.679		1.418	-0.06	-1.164		0.825	-0.10
Widow/ widower	-3.582		4.867	-0.33	0.029		2.507	0.00
Early Years HLE (Continuous scale)	0.165	**	0.068	0.23	0.144	***	0.034	0.19
Teacher Support Factor	4.581	***	1.497	0.25	1.785	**	0.868	0.09
Year 6 Self-Regulation	0.455	***	0.036	1.24	0.520	***	0.018	1.36
Intercept	56.426	***	4.737		44.293	***	2.378	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.160	***	2.696		5.514	***	0.829	
Variance (Level 1)	120.408	***	3.834		131.225	***	1.939	
Total Variance	132.568				136.739			
Number of Level-1 Observations	711				2930			
Number of Level-2 Units	289				775			
Deviance (-2 x Log Restricted-Likelihd)	5348.27				.			
VPC/ ICC	0.092				0.040			
% of Level-1 Variance Reduction	42.45				37.26			
% of Level-2 Variance Reduction	24.02				66.04			
% of Total Variance Reduction	41.14				39.33			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.2.b: The influence students' views of school (Teacher Support) on changes in pro-social behaviour levels across KS3 (Contextual Value-Added Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	2.987	***	0.960	0.26	4.157	***	0.566	0.34
Age within cohort	0.226		0.146	0.13	0.112		0.080	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	0.584		3.053	0.05	0.664		1.337	0.05
Black Caribbean heritage	-3.081		3.279	-0.27	0.354		1.456	0.03
Black African heritage	6.012		4.749	0.53	-0.343		1.826	-0.03
Any other ethnic minority	1.779		4.981	0.16	0.851		1.546	0.07
Indian heritage	0.352		3.907	0.03	1.598		1.704	0.13
Pakistani heritage	-2.906		2.879	-0.26	-0.487		1.248	-0.04
Bangladeshi heritage	-1.448		4.958	-0.13	3.741		2.495	0.31
Mixed race	-1.071		1.953	-0.09	-0.385		1.123	-0.03
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.344		4.272	0.56	0.781		2.323	0.06
Low birth weight (1501-2500 g)	-3.103		2.137	-0.27	0.119		0.957	0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	2.065		1.375	0.18	0.699		0.844	0.06
2 Siblings	2.113		1.558	0.19	-0.087		0.898	-0.01
3+ Siblings	2.620		1.882	0.23	-0.656		1.042	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.035		1.599	-0.18	-2.167	***	0.820	-0.18
2+ Behavioural Problems	-4.327		2.960	-0.38	-1.232		1.751	-0.10
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-0.157		4.004	-0.01	-1.663		2.018	-0.14
Semi-Skilled	-0.121		2.264	-0.01	-1.338		1.058	-0.11
Skilled Manual	0.382		2.019	0.03	0.618		0.955	0.05
Skilled, Non-Manual	2.407		1.914	0.21	1.407		0.904	0.12
Other Professional, Non-Manual	1.244		1.753	0.11	1.442		0.923	0.12
Professional, Non-Manual	4.082	*	2.153	0.36	2.654	**	1.220	0.22
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	-1.989		3.611	-0.18	-1.273		2.130	-0.10
Vocational	-1.673		1.857	-0.15	-0.122		0.892	-0.01
16 academic	-0.883		1.629	-0.08	0.909		0.695	0.07
18 academic	-0.717		2.184	-0.06	1.904	*	1.057	0.16
Degree or equivalent	-0.430		1.976	-0.04	2.849	***	1.016	0.23
Higher degree	1.921		2.511	0.17	2.941	*	1.528	0.24
Marital Status of Parent Ref = Married								
Single	1.040		1.564	0.09	-0.658		0.842	-0.05
Separated/Divorced	-1.310		2.227	-0.12	-1.116		1.164	-0.09
Living with partner	-1.079		1.462	-0.10	-0.998		0.841	-0.08
Widow/ widower	-4.013		5.019	-0.35	0.454		2.583	0.04
Early Years HLE (Continuous scale)	0.140	**	0.070	0.19	0.128	***	0.037	0.16
Teacher Support Factor	4.470	***	1.545	0.23	1.864	**	0.891	0.09
Year 6 Pro-Social Behaviour	0.411	***	0.036	1.09	0.435	***	0.017	1.07
Intercept	59.432	***	4.957		52.535	***	2.382	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.627	***	3.020		6.397	***	0.959	
Variance (Level 1)	128.766	***	4.182		148.138	***	2.147	
Total Variance	140.393				154.536			
Number of Level-1 Observations	711				2930			
Number of Level-2 Units	289				775			
Deviance(-2 x Log Restricted-Likehd)	5388.51				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.083				0.041			
% of Level-1 Variance Reduction [Compared to Null Model]	38.10				29.48			
% of Level-2 Variance Reduction	34.01				58.85			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	37.79				31.50			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.2.c: The influence of students' views of school (Teacher Support) on changes in hyperactivity levels across KS3 (Contextual Value-Added Model)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.816	**	0.889	-0.17	-1.808	***	0.471	-0.16
Age within cohort	-0.061		0.136	-0.04	-0.026		0.070	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-4.430		2.827	-0.41	-1.023		1.301	-0.09
Black Caribbean heritage	4.309		3.013	0.40	-0.356		1.294	-0.03
Black African heritage	2.755		4.367	0.26	1.150		1.640	0.10
Any other ethnic minority	-2.582		4.603	-0.24	-1.139		1.530	-0.10
Indian heritage	-4.683		3.595	-0.44	-1.888		1.696	-0.17
Pakistani heritage	4.246		2.643	0.40	0.012		1.111	0.00
Bangladeshi heritage	-2.354		4.582	-0.22	-3.393		2.210	-0.31
Mixed race	-0.380		1.806	-0.04	-0.002		1.014	-0.00
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-4.001		3.974	-0.37	0.119		1.889	0.01
Low birth weight (1501-2500 g)	4.672	**	1.986	0.44	-0.247		0.897	-0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.271		1.277	-0.03	-0.724		0.754	-0.07
2 Siblings	-0.744		1.443	-0.07	-0.358		0.768	-0.03
3+ Siblings	-0.173		1.744	-0.02	0.653		0.877	0.06
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.614	*	1.480	0.24	2.356	***	0.753	0.21
2+ Behavioural Problems	6.189	**	2.748	0.58	3.135	**	1.594	0.28
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.820		3.716	0.17	2.652		1.807	0.24
Semi-Skilled	1.132		2.098	0.11	2.225	**	0.921	0.20
Skilled Manual	1.706		1.870	0.16	-0.208		0.881	-0.02
Skilled, Non-Manual	-0.370		1.775	-0.03	-1.103		0.845	-0.10
Other Professional, Non-Manual	0.639		1.625	0.06	-0.974		0.807	-0.09
Professional, Non-Manual	-1.308		1.995	-0.12	-1.092		1.055	-0.10
Mother's Highest Qual Early yrs: Ref = None								
Other professional/ Misc.	5.164		3.346	0.48	1.812		1.862	0.16
Vocational	1.241		1.719	0.12	-0.223		0.797	-0.02
16 academic	1.149		1.516	0.11	0.287		0.651	0.03
18 academic	1.015		2.026	0.09	-0.809		0.952	-0.07
Degree or equivalent	0.943		1.835	0.09	-1.418		0.960	-0.13
Higher degree	-1.520		2.324	-0.14	-1.752		1.336	-0.16
Marital Status of Parent Ref = Married								
Single	1.440		1.447	0.13	1.663	**	0.797	0.15
Separated/Divorced	0.044		2.070	0.00	1.566		1.016	0.14
Living with partner	-0.092		1.359	-0.01	1.351		0.993	0.12
Widow/ widower	5.680		4.637	0.53	-0.328		2.632	-0.03
Early Years HLE (Continuous scale)	-0.083		0.065	-0.12	-0.108	***	0.034	-0.15
Y9: Views of School: Teacher Support Factor	-3.011	**	1.430	-0.17	-1.653	*	0.883	-0.09
Year 6 Hyperactivity: SEM CFA Derived Latent Factor, IQ-Standardized	0.485	***	0.035	1.36	0.581	***	0.017	1.58
Intercept	47.429	***	4.896		43.225	***	2.587	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.534	**	1.720		5.230	***	0.778	
Variance (Level 1)	114.474	***	3.448		121.567	***	1.851	
Total Variance	119.009				126.797			
Number of Level-1 Observations	711				2930			
Number of Level-2 Units	289				775			
Deviance (-2 x Log Restricted-Likelihood)	5282.97				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.038				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	45.17				42.52			
Proportion of Level-2 Variance Reduction(%)	72.36				62.36			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	47.15				43.74			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.2.d: The influence of students' views of school (Teacher Support) on changes in anti-social behaviour levels across KS3 (Contextual Value-Added Model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Teacher Support								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.095		0.855	-0.10	-2.482	***	0.615	-0.20
Age within cohort	-0.009		0.133	-0.01	-0.010		0.081	-0.00
Ethnicity: Ref = White UK heritage								
White European heritage	-4.496		2.780	-0.42	-0.212		1.461	-0.02
Black Caribbean heritage	2.450		2.956	0.23	-1.231		1.449	-0.10
Black African heritage	-0.088		4.265	-0.01	1.800		2.124	0.14
Any other ethnic minority	-4.130		4.515	-0.39	0.104		1.847	0.01
Indian heritage	-2.700		3.510	-0.25	-0.370		1.900	-0.03
Pakistani heritage	0.176		2.576	0.02	-0.734		1.357	-0.06
Bangladeshi heritage	-3.000		4.485	-0.28	-2.993		2.565	-0.24
Mixed race	-1.047		1.774	-0.10	0.907		1.340	0.07
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-2.451		3.916	-0.23	1.343		2.266	0.11
Low birth weight (1501-2500 g)	5.156	***	1.949	0.48	1.048		1.113	0.08
Number of Siblings: Ref = No Siblings								
1 Sibling	0.507		1.254	0.05	-0.736		0.822	-0.06
2 Siblings	0.289		1.418	0.03	-0.032		0.952	-0.00
3+ Siblings	1.128		1.714	0.11	1.368		1.181	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.909		1.453	0.18	2.584	***	0.908	0.21
2+ Behavioural Problems	3.198		2.701	0.30	3.314	*	1.846	0.27
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.402		3.663	0.13	3.974	*	2.101	0.32
Semi-Skilled	1.050		2.057	0.10	1.497		1.084	0.12
Skilled Manual	1.646		1.836	0.15	-0.405		1.082	-0.03
Skilled, Non-Manual	-0.466		1.749	-0.04	-1.530		0.967	-0.12
Other Professional, Non-Manual	1.086		1.605	0.10	-0.669		0.943	-0.05
Professional, Non-Manual	-0.640		1.965	-0.06	-1.343		1.256	-0.11
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	3.913		3.278	0.37	2.242		2.166	0.18
Vocational	0.350		1.694	0.03	-0.101		0.945	-0.01
16 academic	-1.325		1.487	-0.12	-0.538		0.833	-0.04
18 academic	-0.480		1.988	-0.04	-1.626		1.195	-0.13
Degree or equivalent	-2.082		1.791	-0.19	-3.186	***	1.126	-0.26
Higher degree	-2.801		2.276	-0.26	-3.238	**	1.573	-0.26
Marital Status of Parent Ref = Married								
Single	0.850		1.416	0.08	1.590	*	0.877	0.13
Separated/Divorced	2.857		2.042	0.27	1.922	*	1.139	0.15
Living with partner	1.379		1.335	0.13	1.491		0.968	0.12
Widow/ widower	6.654		4.557	0.62	-1.134		2.675	-0.09
Early Years HLE (Continuous scale)	-0.040		0.063	-0.06	-0.071		0.047	-0.09
Y9: Views of School: Teacher Support Factor	-3.000	**	1.406	-0.17	-1.488		0.985	-0.07
Year 6 Anti-Social Behaviour	0.470	***	0.036	1.32	0.447	***	0.022	1.08
Intercept	48.344	***	4.913		56.579	***	2.980	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000		0.000		5.310	***	0.982	
Variance (Level 1)	114.439	***	3.117		154.742	***	2.732	
Total Variance	114.439				160.052			
Number of Level-1 Observations	711				2930			
Number of Level-2 Units	289				775			
Deviance (-2 x Log Restricted-Likelihood)	5258.62				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.033			
% of Level-1 Variance Reduction [Compared to Null Model] (%)	45.91				27.49			
% of Level-2 Variance Reduction	100.00				55.54			
% of Total Variance Reduction	49.21				28.98			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Learning Resources

TABLE 6.2.2.3.a: The influence of students' views of school (Learning Resources) on changes in self-regulation levels across KS3 (Contextual Value-Added Model)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	1.402		0.917	0.13	2.205	***	0.527	0.19
Age within cohort	0.135		0.143	0.08	0.102		0.072	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	4.615		2.821	0.42	1.198		1.324	0.10
Black Caribbean heritage	0.025		3.178	0.00	0.009		1.348	0.00
Black African heritage	-0.518		4.625	-0.05	-1.372		1.696	-0.12
Any other ethnic minority	-1.095		4.500	-0.10	0.983		1.597	0.09
Indian heritage	4.037		3.799	0.36	2.900	*	1.674	0.25
Pakistani heritage	-2.387		2.794	-0.22	-0.299		1.171	-0.03
Bangladeshi heritage	-0.962		4.841	-0.09	2.759		2.322	0.24
Mixed race	0.155		1.904	0.01	-0.247		1.013	-0.02
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.709		4.153	0.61	0.198		2.036	0.02
Low birth weight (1501-2500 g)	-5.329	**	2.088	-0.48	0.011		0.926	0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.973		1.334	0.18	0.608		0.822	0.05
2 Siblings	1.659		1.507	0.15	0.060		0.805	0.01
3+ Siblings	2.007		1.825	0.18	-0.466		0.956	-0.04
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-4.028	***	1.497	-0.36	-2.123	***	0.792	-0.19
2+ Behavioural Problems	-6.348	**	2.883	-0.57	-2.285		1.693	-0.20
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.256		3.742	0.11	-0.500		1.858	-0.04
Semi-Skilled	-0.832		2.204	-0.08	-0.869		1.060	-0.08
Skilled Manual	-0.747		1.950	-0.07	0.583		0.898	0.05
Skilled, Non-Manual	2.456		1.829	0.22	2.163	***	0.825	0.19
Other Professional, Non-Manual	0.679		1.703	0.06	1.710	**	0.830	0.15
Professional, Non-Manual	4.167	**	2.089	0.38	3.075	***	1.097	0.27
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	-3.700		3.422	-0.33	-0.562		1.983	-0.05
Vocational	-2.015		1.791	-0.18	0.383		0.817	0.03
16 academic	-1.381		1.575	-0.12	0.314		0.712	0.03
18 academic	-1.508		2.119	-0.14	1.559		1.022	0.14
Degree or equivalent	-1.187		1.925	-0.11	2.391	**	1.054	0.21
Higher degree	1.445		2.457	0.13	3.231	**	1.450	0.28
Marital Status of Parent Ref = Married								
Single	-0.331		1.512	-0.03	-0.694		0.781	-0.06
Separated/Divorced	0.118		2.117	0.01	-0.177		1.058	-0.02
Living with partner	-0.918		1.415	-0.08	-1.185		0.823	-0.10
Widow/ widower	-3.892		4.885	-0.35	-0.029		2.495	-0.00
Early Years HLE (Continuous scale)	0.171	**	0.068	0.24	0.143	***	0.034	0.19
Learning Resources Factor	6.598	**	2.865	0.18	3.950	**	1.742	0.11
Year 6 Self-Regulation	0.459	***	0.036	1.24	0.518	***	0.018	1.36
Intercept	54.008	***	4.753		44.720	***	2.493	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.757	***	2.528		5.611	***	0.830	
Variance (Level 1)	122.572	***	3.820		131.082	***	1.915	
Total Variance	133.329				136.693			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5446.16				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.081				0.041			
% of Level-1 Variance Reduction [Compared to Null Model	41.41				37.32			
% of Level-2 Variance Reduction	32.80				65.44			
% of Total Variance Reduction	40.80				39.35			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Secondary schools that provided better learning resources such as computing laboratories featuring adequate scientific equipment, and well-supplied libraries, promoted better developmental progress across the first stage of secondary education. Attending a secondary school with better learning resources predicted increases in self-regulation (ES=0.18 original data; ES=0.11 imputed data), and social competence (ES=0.25 original data; ES=0.12 imputed data). Further, negative behaviours appeared to be reduced in the presence of adequate learning resources. There were significant reductions in both hyperactivity (ES=-0.19 original data; ES=0.10 imputed data) and anti-social behaviour (ES=-0.22 original data; ES=-0.08 imputed data) between year 6 and Year 9.

TABLE 6.2.2.3.b: The influence of students' views of school (Learning Resources) on changes in pro-social behaviour levels across KS3 (Contextual Value-Added Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	2.787	***	0.953	0.24	4.115	***	0.569	0.34
Age within cohort	0.209		0.146	0.12	0.109		0.080	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	1.179		2.900	0.10	0.660		1.338	0.05
Black Caribbean heritage	-2.566		3.277	-0.23	0.373		1.450	0.03
Black African heritage	5.018		4.760	0.44	-0.374		1.797	-0.03
Any other ethnic minority	0.333		4.638	0.03	0.795		1.547	0.07
Indian heritage	0.888		3.909	0.08	1.730		1.697	0.14
Pakistani heritage	-2.542		2.874	-0.22	-0.453		1.251	-0.04
Bangladeshi heritage	-0.971		4.968	-0.09	3.792		2.530	0.31
Mixed race	-0.645		1.960	-0.06	-0.381		1.126	-0.03
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	7.208	*	4.276	0.63	0.811		2.321	0.07
Low birth weight (1501-2500 g)	-2.871		2.144	-0.25	0.187		0.959	0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	2.228		1.372	0.20	0.680		0.847	0.06
2 Siblings	1.936		1.551	0.17	-0.097		0.902	-0.01
3+ Siblings	2.271		1.878	0.20	-0.657		1.050	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.301		1.541	-0.20	-2.153	***	0.824	-0.18
2+ Behavioural Problems	-4.618		2.966	-0.41	-1.271		1.758	-0.10
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.370		3.852	0.12	-1.655		2.020	-0.14
Semi-Skilled	0.324		2.267	0.03	-1.249		1.063	-0.10
Skilled Manual	0.613		2.007	0.05	0.631		0.954	0.05
Skilled, Non-Manual	2.291		1.883	0.20	1.391		0.897	0.11
Other Professional, Non-Manual	1.389		1.751	0.12	1.401		0.914	0.12
Professional, Non-Manual	4.025	*	2.147	0.35	2.560	**	1.214	0.21
Mother's Highest Qual Early Yrs: Ref = None								
Other professional/ Misc.	-3.036		3.513	-0.27	-1.226		2.131	-0.10
Vocational	-1.496		1.847	-0.13	-0.141		0.884	-0.01
16 academic	-0.817		1.612	-0.07	0.909		0.693	0.07
18 academic	-0.839		2.172	-0.07	1.842	*	1.052	0.15
Degree or equivalent	-0.797		1.963	-0.07	2.745	***	1.014	0.23
Higher degree	1.415		2.520	0.12	2.756	*	1.523	0.23
Marital Status of Parent Ref = Married								
Single	0.878		1.556	0.08	-0.619		0.838	-0.05
Separated/Divorced	-2.111		2.179	-0.19	-1.057		1.173	-0.09
Living with partner	-1.210		1.456	-0.11	-1.013		0.836	-0.08
Widow/ widower	-4.492		5.032	-0.39	0.375		2.566	0.03
Early Years HLE (Continuous scale)	0.144	**	0.070	0.19	0.126	***	0.037	0.16
Learning Resources Factor	9.131	***	2.941	0.25	4.771	**	1.900	0.12
Year 6 Pro-Social Behaviour	0.423	***	0.036	1.11	0.434	***	0.017	1.07
RANDOM-EFFECTS PARAMETERS								
Intercept	58.006	***	4.836		53.341	***	2.422	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.151	***	2.903		6.531	***	0.958	
Variance (Level 1)	129.989	***	4.144		147.824	***	2.150	
Total Variance	141.140				154.354			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5485.56				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.079				0.042			
% of Level-1 Variance Reduction [Compared to Null Model]	37.52				29.63			
% of Level-2 Variance Reduction	36.72				57.99			
% of Total Variance Reduction	37.45				31.58			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.3.c: The influence of students' views of school (Learning Resources) on changes in hyperactivity across KS3 (Contextual Value-Added Model)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.777	**	0.878	-0.17	-1.784	***	0.471	-0.16
Age within cohort	-0.028		0.135	-0.02	-0.024		0.071	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-4.784	*	2.664	-0.45	-1.023		1.299	-0.09
Black Caribbean heritage	4.050		2.993	0.38	-0.374		1.288	-0.03
Black African heritage	3.411		4.349	0.32	1.162		1.659	0.11
Any other ethnic minority	-0.470		4.252	-0.04	-1.083		1.532	-0.10
Indian heritage	-4.973		3.573	-0.47	-2.003		1.688	-0.18
Pakistani heritage	3.951		2.622	0.37	-0.034		1.111	-0.00
Bangladeshi heritage	-2.873		4.559	-0.27	-3.441		2.194	-0.31
Mixed race	-0.666		1.799	-0.06	-0.001		1.013	-0.00
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-4.599		3.942	-0.43	0.101		1.890	0.01
Low birth weight (1501-2500 g)	4.477	**	1.977	0.42	-0.300		0.895	-0.03
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.340		1.263	-0.03	-0.712		0.756	-0.06
2 Siblings	-0.506		1.427	-0.05	-0.352		0.770	-0.03
3+ Siblings	0.168		1.726	0.02	0.651		0.879	0.06
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.833	**	1.416	0.27	2.356	***	0.755	0.21
2+ Behavioural Problems	6.328	**	2.732	0.60	3.181	**	1.605	0.29
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.086		3.546	0.10	2.634		1.804	0.24
Semi-Skilled	0.657		2.083	0.06	2.151	**	0.916	0.20
Skilled Manual	1.425		1.844	0.13	-0.224		0.877	-0.02
Skilled, Non-Manual	-0.584		1.732	-0.05	-1.097		0.837	-0.10
Other Professional, Non-Manual	0.444		1.610	0.04	-0.953		0.800	-0.09
Professional, Non-Manual	-1.265		1.974	-0.12	-1.036		1.052	-0.09
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	5.583	*	3.232	0.53	1.769		1.860	0.16
Vocational	1.043		1.697	0.10	-0.206		0.795	-0.02
16 academic	0.935		1.488	0.09	0.285		0.652	0.03
18 academic	0.831		1.999	0.08	-0.760		0.954	-0.07
Degree or equivalent	0.884		1.810	0.08	-1.341		0.961	-0.12
Higher degree	-1.376		2.315	-0.13	-1.617		1.338	-0.15
Marital Status of Parent Ref = Married								
Single	1.676		1.428	0.16	1.638	**	0.783	0.15
Separated/Divorced	-0.267		2.009	-0.03	1.523		1.012	0.14
Living with partner	0.019		1.342	0.00	1.371		0.986	0.12
Widow/ widower	5.905		4.614	0.56	-0.263		2.599	-0.02
Early Years HLE (Continuous scale)	-0.080		0.064	-0.11	-0.106	***	0.034	-0.15
Y9: Views of School: Learning Resources Factor	-6.629	**	2.708	-0.19	-3.789	***	1.469	-0.10
Year 6 Hyperactivity	0.484	***	0.035	1.37	0.579	***	0.017	1.58
Intercept	47.405	***	4.746		43.096	***	2.584	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.028	**	1.693		5.297	***	0.778	
Variance (Level 1)	113.029	***	3.368		121.451	***	1.856	
Total Variance	118.056				126.748			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likehd)	5367.93				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.043				0.042			
% of Level-1 Variance Reduction [Compared to Null Model] (%)	45.86				42.58			
% of Level-2 Variance Reduction [Compared to Null Model] (%)	69.36				61.88			
% of Total Variance Reduction [Compared to Null Model] (%)	47.57				43.76			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.3.d: The influence of students' views of school (Learning Resources) on changes in anti-social behaviour across KS3 (Contextual Value-Added Model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]:CVA Views of School_Learning Resources								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.091		0.841	-0.10	-2.458	***	0.618	-0.20
Age within cohort	0.031		0.131	0.02	-0.008		0.081	-0.00
Ethnicity: Ref = White UK heritage								
White European heritage	-4.775	*	2.611	-0.45	-0.212		1.460	-0.02
Black Caribbean heritage	2.366		2.928	0.22	-1.249		1.452	-0.10
Black African heritage	0.605		4.233	0.06	1.809		2.158	0.15
Any other ethnic minority	-1.364		4.157	-0.13	0.150		1.854	0.01
Indian heritage	-2.942		3.475	-0.28	-0.474		1.889	-0.04
Pakistani heritage	-0.059		2.545	-0.01	-0.771		1.351	-0.06
Bangladeshi heritage	-3.589		4.446	-0.34	-3.055		2.563	-0.25
Mixed race	-1.300		1.762	-0.12	0.908		1.342	0.07
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-3.009		3.876	-0.28	1.320		2.273	0.11
Low birth weight (1501-2500 g)	5.015	***	1.935	0.47	1.001		1.118	0.08
Number of Siblings: Ref = No Siblings								
1 Sibling	0.361		1.237	0.03	-0.726		0.822	-0.06
2 Siblings	0.507		1.398	0.05	-0.026		0.951	-0.00
3+ Siblings	1.407		1.691	0.13	1.369		1.185	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.885		1.387	0.18	2.578	***	0.917	0.21
2+ Behavioural Problems	3.306		2.678	0.31	3.348	*	1.848	0.27
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.233		3.486	0.02	3.969	*	2.104	0.32
Semi-Skilled	0.458		2.037	0.04	1.438		1.088	0.12
Skilled Manual	1.266		1.806	0.12	-0.424		1.085	-0.03
Skilled, Non-Manual	-1.023		1.702	-0.10	-1.525		0.956	-0.12
Other Professional, Non-Manual	0.794		1.585	0.07	-0.648		0.935	-0.05
Professional, Non-Manual	-0.708		1.940	-0.07	-1.285		1.256	-0.10
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	4.369		3.157	0.41	2.210		2.168	0.18
Vocational	0.355		1.667	0.03	-0.081		0.944	-0.01
16 academic	-1.362		1.457	-0.13	-0.539		0.838	-0.04
18 academic	-0.400		1.955	-0.04	-1.582		1.203	-0.13
Degree or equivalent	-1.967		1.761	-0.19	-3.114	***	1.120	-0.25
Higher degree	-2.442		2.260	-0.23	-3.110	**	1.566	-0.25
Marital Status of Parent Ref = Married								
Single	0.881		1.393	0.08	1.565	*	0.876	0.13
Separated/Divorced	2.295		1.975	0.22	1.887	*	1.131	0.15
Living with partner	1.339		1.315	0.13	1.508		0.971	0.12
Widow/ widower	6.958		4.521	0.66	-1.084		2.664	-0.09
Early Years HLE (Continuous scale)	-0.037		0.062	-0.05	-0.070		0.047	-0.09
Y9: Views of School: Learning Resources Factor	-7.571	***	2.645	-0.22	-3.378	*	2.014	-0.08
Year 6 Anti-Social Behaviour	0.468	***	0.036	1.32	0.446	***	0.022	1.07
Intercept	48.024	***	4.767		56.479	***	2.997	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000	***	0.000		5.270	***	0.973	
Variance (Level 1)	112.753	***	3.044		154.703	***	2.731	
Total Variance	112.753				159.974			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5338.98				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.033			
% of Level-1 Variance Reduction [Compared to Null Model]	46.71				27.51			
% of Level-2 Variance Reduction	100.00				55.88			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	49.96				29.01			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Valuing Pupils

TABLE 6.2.2.4.a: The influence of students' views of school (Valuing Pupils) on changes in self-regulation across KS3 (Contextual Value-Added Model)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	1.351		0.910	0.12	2.198	***	0.527	0.19
Age within cohort	0.128		0.142	0.07	0.103		0.071	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	4.472		2.806	0.41	1.265		1.332	0.11
Black Caribbean heritage	0.805		3.162	0.07	0.146		1.361	0.01
Black African heritage	-0.139		4.593	-0.01	-1.239		1.696	-0.11
Any other ethnic minority	-0.404		4.464	-0.04	1.117		1.613	0.10
Indian heritage	3.873		3.779	0.35	2.897	*	1.685	0.25
Pakistani heritage	-2.580		2.780	-0.23	-0.376		1.174	-0.03
Bangladeshi heritage	-1.784		4.819	-0.16	2.687		2.316	0.23
Mixed race	0.050		1.890	0.00	-0.236		1.017	-0.02
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.000		4.136	0.55	0.095		2.047	0.01
Low birth weight (1501-2500 g)	-5.634	***	2.075	-0.51	-0.091		0.938	-0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	2.086		1.327	0.19	0.649		0.827	0.06
2 Siblings	1.890		1.500	0.17	0.091		0.806	0.01
3+ Siblings	2.262		1.806	0.21	-0.438		0.950	-0.04
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.986	***	1.489	-0.36	-2.103	***	0.795	-0.18
2+ Behavioural Problems	-5.947	**	2.868	-0.54	-2.250		1.691	-0.20
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.409		3.729	0.04	-0.538		1.849	-0.05
Semi-Skilled	-1.343		2.189	-0.12	-0.955		1.064	-0.08
Skilled Manual	-1.261		1.938	-0.11	0.501		0.889	0.04
Skilled, Non-Manual	1.923		1.820	0.17	2.143	***	0.828	0.19
Other Professional, Non-Manual	0.108		1.695	0.01	1.671	**	0.828	0.15
Professional, Non-Manual	3.487	*	2.085	0.32	3.038	***	1.099	0.27
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	-3.320		3.407	-0.30	-0.552		1.973	-0.05
Vocational	-1.804		1.782	-0.16	0.393		0.821	0.03
16 academic	-1.224		1.567	-0.11	0.302		0.710	0.03
18 academic	-1.287		2.106	-0.12	1.593		1.020	0.14
Degree or equivalent	-0.788		1.911	-0.07	2.423	**	1.045	0.21
Higher degree	1.999		2.431	0.18	3.384	**	1.451	0.30
Marital Status of Parent Ref = Married								
Single	-0.438		1.502	-0.04	-0.718		0.793	-0.06
Separated/Divorced	-0.147		2.103	-0.01	-0.192		1.063	-0.02
Living with partner	-0.748		1.409	-0.07	-1.082		0.836	-0.09
Widow/ widower	-3.581		4.856	-0.33	0.034		2.540	0.00
Early Years HLE (Continuous scale)	0.173	***	0.067	0.24	0.145	***	0.034	0.19
Y9: Views of School: Respect for Students Factor	5.593	***	1.627	0.28	2.447	**	1.059	0.12
Year 6 Self-Regulation	0.453	***	0.036	1.24	0.518	***	0.018	1.36
RANDOM-EFFECTS PARAMETERS								
Intercept	56.804	***	4.774		44.917	***	2.467	
Variance (Level 2)	10.713	***	2.601		5.483	***	0.826	
Variance (Level 1)	121.201	***	3.813		131.059	***	1.935	
Total Variance	131.914				136.542			
Number of Level-1 Observations	724				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihd)	5447.61				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.081				0.040			
% of Level-1 Variance Reduction [Compared to Null Model] (%)	42.07				37.34			
% of Level-2 Variance Reduction	33.07				66.23			
% of Total Variance Reduction [Compared to Null Model] (%)	41.43				39.42			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Secondary schools that promoted a culture of valuing pupils were also significantly linked to improvements in social-behavioural outcomes in KS3. Thus, students who rated their secondary schools more highly in terms of Valuing pupils showed significant increases in self-regulation (ES=0.28 original data; ES=0.12 imputed data), and developed more pro-social attitudes towards peers (ES=0.30 original data; ES=0.11 imputed data). Equally, their levels of hyperactivity (ES=0.35 original data; ES=0.15 imputed data) and anti-social behaviour (ES=0.38 original data; ES=0.12 imputed data) were significantly reduced during the first three years of secondary education, assuming otherwise identical socioeconomic and demographic background circumstances.

TABLE 6.2.2.4.b: The influence of students' views of school (Valuing Pupils) on changes in pro-social behaviour across KS3 (Contextual Value-Added Model)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	2.756	***	0.949	0.24	4.124	***	0.565	0.34
Age within cohort	0.208		0.146	0.12	0.111		0.080	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	1.035		2.891	0.09	0.726		1.342	0.06
Black Caribbean heritage	-1.736		3.268	-0.15	0.504		1.458	0.04
Black African heritage	5.551		4.742	0.49	-0.231		1.822	-0.02
Any other ethnic minority	1.192		4.611	0.11	0.930		1.544	0.08
Indian heritage	0.739		3.900	0.07	1.719		1.699	0.14
Pakistani heritage	-2.724		2.868	-0.24	-0.511		1.252	-0.04
Bangladeshi heritage	-1.809		4.960	-0.16	3.712		2.493	0.31
Mixed race	-0.855		1.950	-0.08	-0.379		1.123	-0.03
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.524		4.266	0.58	0.701		2.333	0.06
Low birth weight (1501-2500 g)	-3.208		2.136	-0.28	0.071		0.964	0.01
Number of Siblings: Ref = No Siblings								
1 Sibling	2.366	*	1.367	0.21	0.731		0.857	0.06
2 Siblings	2.207		1.547	0.19	-0.058		0.901	-0.00
3+ Siblings	2.613		1.861	0.23	-0.624		1.054	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.308		1.536	-0.20	-2.145	***	0.823	-0.18
2+ Behavioural Problems	-4.177		2.957	-0.37	-1.247		1.751	-0.10
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.458		3.846	0.04	-1.677		2.030	-0.14
Semi-Skilled	-0.295		2.257	-0.03	-1.345		1.062	-0.11
Skilled Manual	-0.024		1.999	-0.00	0.552		0.952	0.05
Skilled, Non-Manual	1.688		1.877	0.15	1.380		0.903	0.11
Other Professional, Non-Manual	0.750		1.746	0.07	1.377		0.921	0.11
Professional, Non-Manual	3.282		2.148	0.29	2.548	**	1.220	0.21
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	-2.686		3.505	-0.24	-1.226		2.148	-0.10
Vocational	-1.280		1.840	-0.11	-0.130		0.893	-0.01
16 academic	-0.695		1.608	-0.06	0.895		0.695	0.07
18 academic	-0.600		2.163	-0.05	1.883	*	1.057	0.15
Degree or equivalent	-0.296		1.952	-0.03	2.797	***	1.019	0.23
Higher degree	2.156		2.498	0.19	2.951	*	1.526	0.24
Marital Status of Parent Ref = Married								
Single	0.682		1.548	0.06	-0.657		0.843	-0.05
Separated/Divorced	-2.474		2.168	-0.22	-1.082		1.176	-0.09
Living with partner	-1.059		1.452	-0.09	-0.913		0.849	-0.08
Widow/ widower	-4.127		5.015	-0.36	0.455		2.597	0.04
Early Years HLE (Continuous scale)	0.150	**	0.069	0.20	0.129	***	0.037	0.16
Y9: Views of School: Respect for Students Factor	6.007	***	1.684	0.30	2.519	**	1.111	0.11
Year 6 Pro-Social Behaviour	0.410	***	0.036	1.08	0.432	***	0.017	1.07
Intercept	60.389	***	5.002		53.157	***	2.431	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.824	***	3.004		6.370	***	0.959	
Variance (Level 1)	128.675	***	4.138		147.964	***	2.137	
Total Variance	140.499				154.334			
Number of Level-1 Observations	724				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5490.47				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.084				0.041			
% of Level-1 Variance Reduction [Compared to Null Model]	38.15				29.56			
% of Level-2 Variance Reduction	32.90				59.02			
% of Total Variance Reduction [Compared to Null Model] (%)	37.74				31.59			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.4.c: The influence of students' views of school (Valuing Pupils) on changes in hyperactivity across KS3 (Contextual Value-Added Model)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.724	**	0.868	-0.16	-1.776	***	0.472	-0.16
Age within cohort	-0.021		0.133	-0.01	-0.025		0.070	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-4.605	*	2.640	-0.44	-1.101		1.300	-0.10
Black Caribbean heritage	3.128		2.966	0.30	-0.546		1.294	-0.05
Black African heritage	3.061		4.300	0.29	1.021		1.644	0.09
Any other ethnic minority	-1.199		4.200	-0.11	-1.252		1.523	-0.11
Indian heritage	-4.745		3.538	-0.45	-2.028		1.702	-0.18
Pakistani heritage	4.230		2.595	0.40	0.070		1.113	0.01
Bangladeshi heritage	-1.804		4.520	-0.17	-3.341		2.200	-0.30
Mixed race	-0.592		1.778	-0.06	-0.028		1.015	-0.00
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-3.718		3.913	-0.35	0.231		1.894	0.02
Low birth weight (1501-2500 g)	4.830	**	1.957	0.46	-0.184		0.899	-0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.477		1.252	-0.05	-0.761		0.764	-0.07
2 Siblings	-0.793		1.414	-0.08	-0.391		0.772	-0.04
3+ Siblings	-0.222		1.702	-0.02	0.620		0.882	0.06
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.773	**	1.403	0.26	2.326	***	0.755	0.21
2+ Behavioural Problems	5.963	**	2.707	0.57	3.141	**	1.586	0.29
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	2.055		3.521	0.19	2.696		1.801	0.24
Semi-Skilled	1.232		2.062	0.12	2.245	**	0.918	0.20
Skilled Manual	1.975		1.826	0.19	-0.120		0.871	-0.01
Skilled, Non-Manual	0.003		1.718	0.00	-1.070		0.837	-0.10
Other Professional, Non-Manual	1.046		1.596	0.10	-0.892		0.798	-0.08
Professional, Non-Manual	-0.524		1.963	-0.05	-0.960		1.050	-0.09
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	5.075		3.205	0.48	1.732		1.864	0.16
Vocational	0.834		1.681	0.08	-0.221		0.794	-0.02
16 academic	0.712		1.476	0.07	0.296		0.650	0.03
18 academic	0.623		1.980	0.06	-0.798		0.950	-0.07
Degree or equivalent	0.509		1.789	0.05	-1.358		0.951	-0.12
Higher degree	-1.905		2.280	-0.18	-1.761		1.335	-0.16
Marital Status of Parent Ref = Married								
Single	1.778		1.412	0.17	1.652	**	0.802	0.15
Separated/Divorced	0.013		1.988	0.00	1.526		1.028	0.14
Living with partner	-0.159		1.331	-0.02	1.242		0.993	0.11
Widow/ widower	5.580		4.569	0.53	-0.319		2.673	-0.03
Early Years HLE (Continuous scale)	-0.083		0.063	-0.12	-0.109	***	0.034	-0.15
Y9: Views of School: Respect for Students Factor	-6.581	***	1.533	-0.35	-3.016	***	0.942	-0.15
Year 6 Hyperactivity	0.477	***	0.035	1.36	0.578	***	0.018	1.57
Intercept	44.712	***	4.693		42.254	***	2.513	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.445	**	1.671		5.174	***	0.777	
Variance (Level 1)	111.340	***	3.325		121.160	***	1.835	
Total Variance	115.786				126.334			
Number of Level-1 Observations	724				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihd)	5363.78				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.038				0.041			
% of Level-1 Variance Reduction [Compared to Null Model] (%)	46.67				42.71			
% of Level-2 Variance Reduction	72.91				62.76			
% of Total Variance Reduction	48.58				43.95			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.4.d: The influence of students' views of school (Valuing Pupils) on changes in anti-social behaviour across KS3 (Contextual Value-Added Model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Valuing Pupils								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.003		0.831	-0.10	-2.453	***	0.617	-0.20
Age within cohort	0.038		0.130	0.02	-0.009		0.081	-0.00
Ethnicity: Ref = White UK heritage								
White European heritage	-4.575	*	2.583	-0.44	-0.277		1.458	-0.02
Black Caribbean heritage	1.302		2.897	0.12	-1.384		1.453	-0.11
Black African heritage	0.235		4.182	0.02	1.692		2.134	0.14
Any other ethnic minority	-2.204		4.100	-0.21	0.006		1.847	0.00
Indian heritage	-2.700		3.438	-0.26	-0.490		1.898	-0.04
Pakistani heritage	0.216		2.517	0.02	-0.686		1.350	-0.06
Bangladeshi heritage	-2.322		4.405	-0.22	-2.952		2.545	-0.24
Mixed race	-1.228		1.739	-0.12	0.889		1.328	0.07
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-1.968		3.840	-0.19	1.443		2.272	0.12
Low birth weight (1501-2500 g)	5.402	***	1.913	0.51	1.103		1.133	0.09
Number of Siblings: Ref = No Siblings								
1 Sibling	0.212		1.224	0.02	-0.771		0.827	-0.06
2 Siblings	0.196		1.383	0.02	-0.060		0.956	-0.00
3+ Siblings	0.950		1.665	0.09	1.338		1.182	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.842		1.372	0.18	2.559	***	0.907	0.21
2+ Behavioural Problems	2.913		2.650	0.28	3.313	*	1.838	0.27
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.324		3.454	0.13	4.011	*	2.113	0.32
Semi-Skilled	1.126		2.012	0.11	1.516		1.081	0.12
Skilled Manual	1.879		1.785	0.18	-0.332		1.074	-0.03
Skilled, Non-Manual	-0.358		1.686	-0.03	-1.504		0.963	-0.12
Other Professional, Non-Manual	1.484		1.569	0.14	-0.602		0.941	-0.05
Professional, Non-Manual	0.114		1.927	0.01	-1.229		1.258	-0.10
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	3.832		3.126	0.36	2.184		2.181	0.18
Vocational	0.150		1.649	0.01	-0.097		0.944	-0.01
16 academic	-1.560		1.441	-0.15	-0.530		0.833	-0.04
18 academic	-0.643		1.933	-0.06	-1.613		1.193	-0.13
Degree or equivalent	-2.350		1.737	-0.22	-3.129	***	1.128	-0.25
Higher degree	-3.051		2.222	-0.29	-3.242	**	1.580	-0.26
Marital Status of Parent Ref = Married								
Single	1.003		1.375	0.10	1.579	*	0.884	0.13
Separated/Divorced	2.637		1.951	0.25	1.888	*	1.133	0.15
Living with partner	1.134		1.301	0.11	1.395		0.967	0.11
Widow/ widower	6.487		4.469	0.62	-1.142		2.699	-0.09
Early Years HLE (Continuous scale)	-0.039		0.061	-0.06	-0.072		0.047	-0.09
Y9: Views of School: Respect for Students Factor	-7.152	***	1.494	-0.38	-2.606	**	1.147	-0.12
Year 6 Anti-Social Behaviour	0.463	***	0.035	1.32	0.444	***	0.022	1.07
Intercept	44.955	***	4.704		55.862	***	2.798	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000	***	0.000		5.228	***	0.976	
Variance (Level 1)	110.322	***	2.976		154.477	***	2.680	
Total Variance	110.322				159.705			
Number of Level-1 Observations	724				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5332.72				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.033			
% of Level-1 Variance Reduction [Compared to Null Model] (%)	47.86				27.62			
% of Level-2 Variance Reduction	100.00				56.23			
% of Total Variance Reduction [Compared to Null Model] (%)	51.04				29.13			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Negative Behavioural Climate

TABLE 6.2.2.5.a: The influence of students' views of school (Negative Behavioural Climate) on changes in self-regulation across KS3 (Contextual Value-Added Model)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Negative Behavioural Climate								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	1.513	*	0.916	0.14	2.315	***	0.536	0.20
Age within cohort	0.167		0.143	0.10	0.103		0.072	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	4.603		2.818	0.42	1.283		1.322	0.11
Black Caribbean heritage	0.253		3.170	0.02	0.035		1.340	0.00
Black African heritage	0.229		4.610	0.02	-1.176		1.685	-0.10
Any other ethnic minority	1.220		4.848	0.11	0.941		1.582	0.08
Indian heritage	3.674		3.797	0.33	2.712		1.663	0.24
Pakistani heritage	-2.358		2.786	-0.21	-0.248		1.167	-0.02
Bangladeshi heritage	-0.952		4.835	-0.09	2.823		2.337	0.25
Mixed race	-0.158		1.897	-0.01	-0.231		1.007	-0.02
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.330		4.154	0.57	0.200		2.055	0.02
Low birth weight (1501-2500 g)	-5.490	***	2.084	-0.50	0.012		0.936	0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.911		1.333	0.17	0.603		0.811	0.05
2 Siblings	1.807		1.506	0.16	0.056		0.804	0.00
3+ Siblings	2.025		1.814	0.18	-0.440		0.951	-0.04
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.959	***	1.496	-0.36	-2.097	***	0.795	-0.18
2+ Behavioural Problems	-6.155	**	2.882	-0.56	-2.165		1.688	-0.19
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.796		3.745	0.07	-0.554		1.870	-0.05
Semi-Skilled	-1.167		2.202	-0.11	-0.981		1.050	-0.09
Skilled Manual	-1.142		1.952	-0.10	0.388		0.888	0.03
Skilled, Non-Manual	1.980		1.833	0.18	1.963	**	0.834	0.17
Other Professional, Non-Manual	0.230		1.702	0.02	1.404	*	0.830	0.12
Professional, Non-Manual	3.622	*	2.095	0.33	2.698	**	1.102	0.24
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	-4.168		3.417	-0.38	-0.800		1.981	-0.07
Vocational	-2.077		1.792	-0.19	0.308		0.827	0.03
16 academic	-1.482		1.575	-0.13	0.250		0.724	0.02
18 academic	-1.659		2.119	-0.15	1.398		1.026	0.12
Degree or equivalent	-1.381		1.930	-0.12	2.130	**	1.073	0.19
Higher degree	1.461		2.456	0.13	2.865	**	1.453	0.25
Marital Status of Parent Ref = Married								
Single	-0.286		1.511	-0.03	-0.731		0.769	-0.06
Separated/Divorced	0.241		2.118	0.02	-0.110		1.065	-0.01
Living with partner	-0.761		1.415	-0.07	-1.091		0.826	-0.10
Widow/ widower	-3.427		4.876	-0.31	0.242		2.514	0.02
Early Years HLE (Continuous scale)	0.162	**	0.068	0.22	0.139	***	0.034	0.19
Y9: Views of School: Negative Behavioural Climate Factor	-3.160	**	1.364	-0.20	-2.938	***	0.726	-0.18
Year 6 Self-Regulation	0.450	***	0.037	1.22	0.509	***	0.018	1.34
Intercept	45.245	***	4.584		37.881	***	2.228	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.939	***	2.548		5.646	***	0.835	
Variance (Level 1)	122.814	***	3.849		130.483	***	1.926	
Total Variance	132.753				136.129			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5445.46				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.075				0.041			
% of Level-1 Variance Reduction [Compared to Null Model]	41.30				37.61			
% of Level-2 Variance Reduction	37.90				65.23			
% of Total Variance Reduction	41.05				39.60			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Students in secondary schools with a negative behavioural climate made significantly less progress in self-regulation (ES=-0.20 original data; ES=-0.18 imputed data) and pro-social behaviour (ES=-0.24 original data; ES=-0.18 imputed data) compared to similar students in secondary schools with a more positive behavioural climate. They also showed increased hyperactivity (ES=0.17 original data; ES=0.16 imputed data) and anti-social behaviour (ES=0.30 original data; ES=0.17 imputed data).

TABLE 6.2.2.5.b: The influence of negative behavioural climate on changes in pro-social behaviour across KS3 (Contextual Value-Added Model)

FIXED-EFFECTS PARAMETERS	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
Gender	2.906	***	0.955	0.25	4.223	***	0.567	0.35
Age within cohort	0.242	*	0.147	0.13	0.109		0.081	0.06
Ethnicity: Ref = White UK heritage								
White European heritage	1.191		2.903	0.10	0.753		1.337	0.06
Black Caribbean heritage	-2.241		3.276	-0.20	0.379		1.445	0.03
Black African heritage	6.032		4.756	0.53	-0.168		1.824	-0.01
Any other ethnic minority	1.855		5.007	0.16	0.739		1.552	0.06
Indian heritage	0.446		3.916	0.04	1.503		1.688	0.12
Pakistani heritage	-2.432		2.872	-0.21	-0.404		1.241	-0.03
Bangladeshi heritage	-0.949		4.972	-0.08	3.812		2.497	0.31
Mixed race	-1.050		1.957	-0.09	-0.366		1.118	-0.03
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	6.743		4.288	0.59	0.832		2.361	0.07
Low birth weight (1501-2500 g)	-3.131		2.147	-0.27	0.189		0.960	0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	2.163		1.374	0.19	0.668		0.835	0.06
2 Siblings	2.092		1.554	0.18	-0.106		0.887	-0.01
3+ Siblings	2.353		1.870	0.21	-0.632		1.042	-0.05
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.242		1.544	-0.20	-2.120	***	0.821	-0.17
2+ Behavioural Problems	-4.350		2.974	-0.38	-1.133		1.764	-0.09
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.986		3.864	0.09	-1.696		2.013	-0.14
Semi-Skilled	-0.037		2.271	-0.00	-1.375		1.053	-0.11
Skilled Manual	0.212		2.014	0.02	0.432		0.946	0.04
Skilled, Non-Manual	1.817		1.892	0.16	1.172		0.907	0.10
Other Professional, Non-Manual	0.902		1.755	0.08	1.077		0.924	0.09
Professional, Non-Manual	3.425		2.159	0.30	2.162	*	1.232	0.18
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	-3.633		3.517	-0.32	-1.517		2.158	-0.12
Vocational	-1.659		1.853	-0.14	-0.227		0.898	-0.02
16 academic	-1.055		1.618	-0.09	0.827		0.701	0.07
18 academic	-1.091		2.179	-0.10	1.654		1.049	0.14
Degree or equivalent	-1.081		1.977	-0.09	2.455	**	1.024	0.20
Higher degree	1.412		2.528	0.12	2.368		1.536	0.20
Marital Status of Parent Ref = Married								
Single	0.830		1.558	0.07	-0.662		0.821	-0.05
Separated/Divorced	-2.027		2.185	-0.18	-0.987		1.176	-0.08
Living with partner	-1.031		1.460	-0.09	-0.906		0.840	-0.07
Widow/ widower	-3.934		5.034	-0.34	0.674		2.562	0.06
Early Years HLE (Continuous scale)	0.138	**	0.070	0.18	0.121	***	0.037	0.15
Negative Behavioural Climate Factor	-3.821	***	1.399	-0.24	-3.035	***	0.827	-0.18
Year 6 Pro-Social Behaviour	0.411	***	0.036	1.08	0.428	***	0.018	1.06
Intercept	46.720	***	4.801		45.561	***	2.439	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	10.007	***	2.909		6.393	***	0.951	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	131.127	***	4.199		147.431	***	2.153	
Total Variance	141.135				153.824			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5488.15				.			
VPC / ICC	0.071				0.042			
% of Level-1 Variance Reduction	36.97				29.81			
% of Level-2 Variance Reduction	43.21				58.87			

% of Total Variance Reduction	37.46				31.81			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.5.c: The influence of negative behavioural climate on changes in hyperactivity across KS3

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Negative Behavioural Climate								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.832	**	0.880	-0.17	-1.887	***	0.479	-0.17
Age within cohort	-0.062		0.135	-0.04	-0.025		0.071	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-4.782	*	2.668	-0.45	-1.101		1.291	-0.10
Black Caribbean heritage	3.795		2.992	0.36	-0.387		1.285	-0.04
Black African heritage	2.666		4.343	0.25	0.994		1.640	0.09
Any other ethnic minority	-2.543		4.588	-0.24	-1.043		1.538	-0.09
Indian heritage	-4.694		3.579	-0.44	-1.843		1.672	-0.17
Pakistani heritage	3.877		2.618	0.36	-0.085		1.108	-0.01
Bangladeshi heritage	-2.846		4.563	-0.27	-3.500		2.221	-0.32
Mixed race	-0.334		1.796	-0.03	-0.011		1.006	-0.00
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-4.309		3.954	-0.40	0.090		1.877	0.01
Low birth weight (1501-2500 g)	4.674	**	1.978	0.44	-0.296		0.900	-0.03
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.303		1.265	-0.03	-0.708		0.758	-0.06
2 Siblings	-0.657		1.429	-0.06	-0.351		0.772	-0.03
3+ Siblings	0.026		1.719	0.00	0.629		0.884	0.06
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.793	**	1.418	0.26	2.338	***	0.758	0.21
2+ Behavioural Problems	6.223	**	2.738	0.58	3.075	*	1.592	0.28
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.385		3.556	0.13	2.665		1.799	0.24
Semi-Skilled	0.976		2.086	0.09	2.250	**	0.913	0.20
Skilled Manual	1.761		1.849	0.16	-0.057		0.871	-0.01
Skilled, Non-Manual	-0.178		1.741	-0.02	-0.918		0.843	-0.08
Other Professional, Non-Manual	0.780		1.613	0.07	-0.689		0.797	-0.06
Professional, Non-Manual	-0.889		1.984	-0.08	-0.713		1.049	-0.06
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	6.007	*	3.235	0.56	1.989		1.867	0.18
Vocational	1.120		1.702	0.10	-0.141		0.800	-0.01
16 academic	1.021		1.492	0.10	0.344		0.662	0.03
18 academic	0.997		2.005	0.09	-0.620		0.955	-0.06
Degree or equivalent	1.042		1.821	0.10	-1.118		0.961	-0.10
Higher degree	-1.444		2.321	-0.14	-1.310		1.338	-0.12
Marital Status of Parent Ref = Married								
Single	1.686		1.429	0.16	1.672	**	0.778	0.15
Separated/Divorced	-0.309		2.014	-0.03	1.470		1.032	0.13
Living with partner	-0.082		1.345	-0.01	1.287		0.993	0.12
Widow/ widower	5.516		4.616	0.52	-0.519		2.628	-0.05
Early Years HLE (Continuous scale)	-0.075		0.064	-0.11	-0.103	***	0.034	-0.14
Negative Behavioural Climate Factor	2.475	*	1.292	0.17	2.537	***	0.728	0.16
Year 6 Hyperactivity	0.478	***	0.036	1.34	0.572	***	0.018	1.56
Intercept	56.560	***	5.346		50.674	***	2.885	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	3.981	*	1.634		5.319	***	0.771	
Variance (Level 1)	114.119	***	3.391		121.055	***	1.836	
Total Variance	118.100				126.375			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihd)	5370.38				.			
VPC / ICC)	0.034				0.042			
% of Level-1 Variance Reduction	45.34				42.76			
% of Level-2 Variance	75.74				61.71			
% of Total Variance Reduction	47.55				43.93			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

TABLE 6.2.2.5.d: The influence of students' views of school (Negative Behavioural Climate) on changes in anti-social behaviour across KS3 (Contextual Value-Added Model)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: CVA Views of School_Negative Behavioural Climate								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-1.183		0.838	-0.11	-2.535	***	0.615	-0.20
Age within cohort	-0.002		0.131	-0.00	-0.006		0.081	-0.00
Ethnicity: Ref = White UK heritage								
White European heritage	-4.718	*	2.599	-0.45	-0.301		1.440	-0.02
Black Caribbean heritage	2.124		2.911	0.20	-1.252		1.446	-0.10
Black African heritage	-0.287		4.209	-0.03	1.618		2.127	0.13
Any other ethnic minority	-3.326		4.464	-0.31	0.204		1.846	0.02
Indian heritage	-2.341		3.465	-0.22	-0.293		1.860	-0.02
Pakistani heritage	-0.074		2.531	-0.01	-0.807		1.342	-0.07
Bangladeshi heritage	-3.637		4.426	-0.34	-3.087		2.570	-0.25
Mixed race	-0.981		1.749	-0.09	0.872		1.325	0.07
Birth weight: Ref =Normal (> 2500 g)								
Foetal infant/very low(<=1500g)	-2.371		3.862	-0.22	1.299		2.253	0.10
Low birth weight (1501-2500 g)	5.209	***	1.924	0.49	0.989		1.121	0.08
Number of Siblings: Ref = No Siblings								
1 Sibling	0.448		1.231	0.04	-0.711		0.832	-0.06
2 Siblings	0.318		1.391	0.03	-0.017		0.954	-0.00
3+ Siblings	1.296		1.675	0.12	1.347		1.192	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	1.803		1.381	0.17	2.538	***	0.916	0.20
2+ Behavioural Problems	3.036		2.668	0.29	3.206	*	1.844	0.26
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	0.591		3.472	0.06	4.021	*	2.097	0.32
Semi-Skilled	0.728		2.029	0.07	1.538		1.079	0.12
Skilled Manual	1.599		1.801	0.15	-0.224		1.081	-0.02
Skilled, Non-Manual	-0.488		1.701	-0.05	-1.302		0.982	-0.10
Other Professional, Non-Manual	1.250		1.578	0.12	-0.316		0.946	-0.03
Professional, Non-Manual	-0.041		1.938	-0.00	-0.866		1.269	-0.07
Mother's Highest Qual Early Yrs Ref = None								
Other professional/ Misc.	5.084		3.143	0.48	2.480		2.188	0.20
Vocational	0.650		1.664	0.06	0.002		0.943	0.00
16 academic	-1.094		1.453	-0.10	-0.462		0.860	-0.04
18 academic	0.061		1.953	0.01	-1.386		1.207	-0.11
Degree or equivalent	-1.374		1.768	-0.13	-2.788	**	1.116	-0.22
Higher degree	-2.038		2.259	-0.19	-2.663	*	1.568	-0.21
Marital Status of Parent Ref = Married								
Single	0.795		1.387	0.08	1.580	*	0.869	0.13
Separated/Divorced	2.081		1.969	0.20	1.801		1.129	0.15
Living with partner	1.109		1.310	0.10	1.392		0.973	0.11
Widow/ widower	6.434		4.497	0.61	-1.356		2.691	-0.11
Early Years HLE (Continuous scale)	-0.027		0.062	-0.04	-0.064		0.048	-0.08
Negative Behavioural Climate Factor	4.464	***	1.242	0.30	2.955	***	0.937	0.17
Year 6 Anti-Social Behaviour	0.455	***	0.036	1.29	0.441	***	0.022	1.06
Intercept	61.738	***	5.096		64.239	***	3.246	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	0.000	***	0.000		5.130	***	0.958	
Variance (Level 1)	111.678	***	3.015		154.112	***	2.646	
Total Variance	111.678				159.242			
Number of Level-1 Observations	723				2930			
Number of Level-2 Units	293				775			
Deviance (-2 x Log Restricted-Likelihood)	5333.74				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.000				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	47.22				27.79			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	100.00				57.05			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	50.44				29.34			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

Overall these results show that there is significant variation in students' social-behavioural development across KS3. Both individual student, family and home learning environment factors play a role in shaping such changes in social behaviour, with a tendency for the equity gap in behavioural outcomes to widen for some groups. In addition features of the secondary school environment relating to teacher support, the learning resources and social emotional climate also predict changes in EPPSE students' social behaviour. How students' experience their secondary schools predicts both social-behavioural outcomes and development and, as we report elsewhere, also their academic attainment and progress from Year 6 to Year 9.

SECTION 7: Summary and Conclusions

This report provides a detailed analysis of the social-behavioural outcomes and development of students at the end of Key Stage 3 (KS3) in secondary schools in England. The research is part of the longitudinal Effective Pre-school Primary and Secondary Education (EPPSE) project. Measures of students' social-behavioural outcomes were based on individual teacher assessments conducted in Year 9. The investigation builds on earlier research that followed this group of students from early childhood at age 3 years through primary and into secondary school up to age 14. The EPPSE research has examined not only students' social-behavioural development but also their academic attainments (measured by national Teacher Assessments conducted at the end of KS3) in English, maths and science and dispositions (measured by factors from student completed questionnaires) such as academic self concept, enjoyment of school etc. The results in this report on social-behaviour outcomes complement those reported on academic and affective outcomes for this age group at the end of Key Stage 3 of secondary education (see Sammons et al., 2011a; 2011b).

The research focuses on four measures of social behaviour derived from exploratory and confirmatory factor analysis. These include two positive forms of behaviour - *Self regulation* and *Pro-sociability*, and two negative behaviours- *Hyperactivity* and *Anti-social behaviour*. In line with other research on social behaviour EPPSE found that most students are rated favourably by teachers in terms of their behaviour in secondary school. Teachers' ratings are skewed towards the positive end of the rating scales for most students and only a minority are identified as showing poor behaviour. For example, only approximately 17% of the sample were rated unfavourably in terms of high scores for 'hyperactivity', and even fewer (no more than 14%) for 'anti social' behaviour in Year 9.

The patterns of social behaviour studied now that students are in adolescence can be compared with earlier findings for this sample at younger ages (in pre-school and primary school). Although most students are still rated favourably in terms of social-behavioural outcomes at age 14, the proportions identified as showing negative behaviour has increased compared with previous patterns found in primary school.

At younger ages the EPPSE research showed that a range of factors related to child and family characteristics and the home learning environment (HLE) were important predictors of children's academic attainment and progress and their social-behavioural development up to the end of primary school (Sammons et al., 2008a; 2008b). The influence of such factors was detected at a young age and they continued to predict later educational outcomes.

While the relationships between individual child, family and home learning environment characteristics and student outcomes tends to be weaker for social-behavioural measures than for academic attainment, earlier phases of the research has shown that early experiences of socio-economic disadvantage predict poorer behavioural outcomes in both pre-school and primary school.

The earlier EPPSE results have contributed to current understanding about the relationships between social behaviour and children's academic development and the factors that increase the risk of poor outcomes or that promote resilience. The findings have also informed policy development in England (or example, see the EPPE research contribution to the Cabinet Office Equalities Review, 2006, and the family and child case studies, Siraj-Blatchford et al., 2011).

The 3-14 phase of the EPPSE research follows the EPPSE student sample in adolescence (Year 9 age 14) and provides new evidence about the continuing influence of individual, family and home learning influences. Teacher judgments of student behaviour in school have been found to be predictive of later development and provide an important perspective that can be compared with students' self reports of their own behaviour and dispositions and their experiences of secondary school.

This report identifies which individual student, family and home learning factors continue to predict EPPSE students' social behaviour at the end of KS3. The results show many similarities to findings about which factors were important at younger ages. While many finding on the impact of different background factors such as gender, family SES or income are similar to other research studies, EPPSE has additional data on the early years Home Learning Environment, (HLE) and parental qualifications that allows a deeper exploration of family influences on students across different phases of education. The findings demonstrate that family factors continue to influence students' social-behavioural development as well as their academic progress across KS3. It should be noted that in the analyses of developmental progress in KS3, prior social behaviour measured at the end of primary education (Y6 KS2) was controlled for in the statistical models.

This report focuses on quantitative analyses of factors that predict social-behavioural outcomes and developmental progress across KS3. A range of multilevel statistical models were developed to test which factors predict social-behavioural outcomes. Elsewhere, EPPSE has reported (in keeping with the mixed qualitative/quantitative methodology) findings from qualitative case studies of individual children and families that are more educationally successful in overcoming disadvantage and promote resilience (see Siraj-Blatchford et al., 2011). Such qualitative data helps to provide a broader understanding of the way disadvantage and other experiences shape children's educational outcomes and experiences as they move through different phases of education and into adolescence, and what factors may help to protect against the adverse consequences of disadvantage. These case studies show that certain behavioural traits can be important in supporting better attainment outcomes for vulnerable groups of disadvantaged students, and indicate that 'self regulation' and a positive early years HLE can help to protect students from social disadvantage and support better educational outcomes in the longer term.

As well as investigating the impact of child, family and HLE background, the EPPSE research has explored the continued influence of pre-school and primary school as predictors of students' later social-behavioural outcomes up to age 14 as well as measures related to students' secondary school experiences. The results provide new evidence on the way different educational settings (pre-school, primary and secondary) affect these students' social behaviour and developmental progress in KS3.

The aims of the research were to:

- investigate the variation in students' social-behavioural outcomes at the end of Key Stage 3;
- identify which background characteristics, individual student, family and home learning environment (HLE) predict social-behavioural outcomes at age 14;
- explore the influence of pre, primary and secondary school on social-behavioural outcomes and developmental progress;
- examine the combined impact of pre-school with the HLE as predictors of social-behavioural outcomes and establish how far any continuing pre-school effects are conditional upon other educational experiences such as those offered by the HLE;
- assess whether the continued impact of pre-school and primary school influences differs for more and less disadvantaged students;
- explore the effects of teaching and school processes on students' social-behavioural outcomes using student reported measures of such processes.

In order to maximise the sample size and to limit possible bias linked to missing data, multiple imputation of missing data was conducted. Careful comparisons of the results from both imputed and non imputed data sets were made and these indicate that the results are robust producing patterns that were broadly consistent. The similarities and differences between the original and the imputed data are highlighted throughout the report. The analyses reported are based on data for a longitudinal sample of a maximum N= 1,508 EPPSE students attending 444 secondary schools (original data set) and N= 2,933 students attending 775 secondary schools (imputed)[25].

[2525] There is considerable variability in the sample size for the original data, depending on the fraction of missing data for the various predictors included in each estimated model. For the imputed data the sample size is relatively constant, except for models with structurally missing data (which we do not impute for substantive reasons). In each table we therefore indicate the number of students and the number of schools on which the estimates are based.

Summary of Main Findings

Variations in social-behavioural outcomes in Year 9 for different student groups

EPPSE investigated the influence of a wide range of demographic and socio-economic measures from parental interviews and questionnaires as predictors of student behaviour at age 14. These include individual characteristics, such gender, age, ethnicity, early childhood behavioural history, and family factors, including family size (number of siblings), parents' marital status, earned income, family highest socio-economic status (SES), as well as the highest level of parents' qualifications. EPPSE also investigated factors specific to the educational system in England, such as receipt of English as an Additional Language (EAL) support, Special Education Needs (SEN) status, and Free School Meals (FSM) eligibility. The following summarises the key findings.

Girls show better social-behavioural profiles than boys at age 14 in all four outcomes (e.g., ES=0.45 for 'self-regulation' and ES=-0.42 for 'anti-social'). Family SES, income and parents' highest qualification levels are also strong predictors. For example, the Effect Size (ES) for mothers having a degree or equivalent was ES=0.47 for 'self-regulation' and ES-0.40 for 'hyperactivity'. By contrast, there are weaker effects linked to parents' marital status, although there is a tendency for increased 'hyperactivity' and 'anti-social' behaviour for those from single parent families (ES=0.20 for 'hyperactivity' for single parents versus married parents).

The early years and KS2 home learning environment (HLE) continues to predict students' social-behavioural outcomes up to age 14, taking into account other influences. Those students who had experienced a more positive HLE in the early years and later on in primary school were rated more favourably by teachers in terms of various social-behavioural outcomes in Year 9 (ES=0.48 for the high versus low HLE groups).

Students with a record of Special Educational Needs (SEN) in secondary school show significantly poorer behavioural outcomes, the two possibly being reciprocal relationships. The strength of relationships is in line with the SEN research literature and findings for this group at younger ages (Anders et al., 2010; Taggart et al., 2006; Sammons et al., 2003; Sammons et al., 2004).

EPPSE developed an index of multiple disadvantage that provides a summary measure of overall disadvantage experienced by children in the EPPSE sample during the early years. This continues to be a strong predictor of differences in these students' later social behaviour up to age 14. Those who had experienced several disadvantages in the early years show poorer 'self-regulation' and 'pro-social' behaviour and increased scores for 'hyperactivity' and 'anti-social' behaviour in KS3.

Overall these findings on the individual and family factors that predict social-behavioural outcomes show similar patterns to those reported elsewhere for EPPSE students' academic attainments measured by national TAs in the three core curriculum subjects (English, maths and science) at the end of KS3.

TABLE 1: Summary of background influences on social-behavioural outcomes

Factors	Self-regulation	Pro-social	Hyperactivity	Anti-social
Student factors				
Gender (boys)	0.45	0.61	-0.54	-0.42
Age (continuous)	0.12	0.08	-0.08	ns
Birth weight (normal)				
Foetal infant/very low weight	ns	ns	ns	ns
Low birth weight	ns	ns	ns	ns
Number of siblings (none)				
1 sibling	0.13	0.11	-0.15	-0.12
2 siblings	ns	ns	ns	ns
3 siblings	ns	ns	ns	ns
Ethnicity (White UK heritage)				
White European heritage	ns	ns	ns	ns
Black Caribbean heritage	ns	ns	ns	ns
Black African heritage	ns	ns	ns	ns
Any other ethnic minority	ns	ns	ns	ns
Indian heritage	0.33	ns	-0.33	ns
Pakistani heritage	ns	ns	ns	ns
Bangladeshi heritage	0.37	ns	-0.48	-0.34
Mixed race	ns	ns	ns	ns
Early behavioural problems (none)				
1 Behavioural Problem	-0.30	-0.28	0.36	0.32
2+ Behavioural Problems	-0.34	ns	0.44	0.33
Family factors				
Parents' Highest SES at KS2 (unemployed/not working)				
Unskilled	ns	ns	ns	ns
Semi-skilled	ns	ns	0.17	ns
Skilled, Manual	ns	ns	ns	ns
Skilled, Non-Manual	0.30	0.20	-0.20	-0.20
Other Professional, Non-Manual	0.31	0.23	-0.24	-0.19
Professional, Non-Manual	0.45	0.31	-0.28	-0.25
Mother's Highest Qualification Level (none)				
Other Professional/Misc.	ns	ns	ns	ns
Vocational	ns	ns	ns	ns
16 academic	0.17	0.15	-0.15	-0.13
18 academic	0.31	0.22	-0.25	-0.21
Degree or equivalent	0.47	0.36	-0.40	-0.37
Higher degree	0.54	0.35	-0.43	-0.36
Marital Status of Parent/Guardian/Carer (married)				
Single	-0.13	ns	0.21	0.15
Separated/Divorced	ns	ns	0.21	0.18
Living with partner	-0.18	-0.13	0.21	0.14
Widow/Widower	ns	ns	ns	ns
Home Learning Environment				
Early Years Home Learning Environment (HLE) Index (Grouped) (Very low)				
Low (Index values: 14-19)	0.15	0.13	ns	ns
Average (Index values: 20-24)	0.17	ns	ns	ns
High (Index values: 25-32)	0.32	0.27	-0.25	ns
Very high (Index values: 33-45)	0.48	0.30	-0.35	ns
Early years HLE (Continuous scale)	N/A	N/A	N/A	-0.12*

Neighbourhood influences
Various measures of neighbourhood disadvantage were also tested to see if they predicted students' social-behavioural outcomes at age 14, while controlling for the effects of individual, family and HLE measures discussed above. There was evidence that the level of overall disadvantage in the neighbourhood, measured by two national measures, the Index of Multiple Deprivation (Noble et al., 2004) and the Income Deprivation Affecting Children Index (IDACI) scores, as well as other area based measures such as lower participation in employment, the incidence of crime, and the incidence of limiting long-term illness in the population, all predicted poorer social-behavioural outcomes for the EPPSE sample in KS3.

Living in a neighbourhood with higher levels of deprivation among children aged under 16 on the IDACI predicted poorer 'self-regulation', and higher levels of 'hyperactivity' and 'anti-social' behaviour. Higher neighbourhood scores for the IMD predicted increased 'hyperactivity'. Higher levels of criminality in neighbourhoods predicted poorer outcomes in all four social-behavioural domains (e.g., ES=0.14 for 'hyperactivity'). Higher levels of unemployment in the area likewise predicted higher 'hyperactivity' among Year 9 EPPSE students. Finally, a higher incidence of limiting long-term illness in the neighbourhood predicted lower 'self-regulation' at the end of Key Stage 3. All these relationships had effect sizes in the range of 0.08 to 0.14 (for imputed data) after controlling for the influence of individual, family and HLE factors discussed above.

Educational experiences from pre-school to secondary school

EPPSE investigated the impact of educational environments from the pre-school to primary school in shaping students' social-behavioural outcomes at age 14.

Pre-school influences
In order to assess whether the impact of early educational settings on social behaviour continued throughout Key Stage 3, we tested measures related to pre-school: exposure (i.e., attended pre-school or not), duration, quality and pre-school effectiveness.

The results indicate that attending just any pre-school centre did not predict social-behavioural outcomes in Year 9. Further, the influence of pre-school effectiveness measures was no longer visible at age 14, in contrast to findings when the EPPSE sample were in primary school. However, the quality of the pre-school setting as measured by the Early Childhood Environment (ECERS) observational scales continued to be significant for all four social-behavioural outcomes at the end of Key Stage 3, both unconditionally and when tested in combination with the quality of early years HLE.

Overall, students who had attended higher quality pre-schools still showed significantly better social-behavioural outcomes at age 14 than the home group or than those who had experienced only low quality pre-school. These relatively small effects were consistent in predicting better outcomes, for 'self-regulation' (ES=0.14 high quality versus home group), 'pro-social' (ES=0.14), 'hyperactivity' (ES= -0.13) and 'anti-social' (ES= -0.14) behaviour.

The results suggest that the effects of pre-school may be partly dependant on other experiences such as the quality of the early years HLE. Having attended a medium or higher quality pre-school showed lasting benefits for students from most HLE groups. For those who had attended a low quality pre-school who were also from a low or average HLE group, there were significant positive benefits for 'self-regulation' and 'pro-social' behaviour (ES=0.50 for 'self-regulation').

For hyperactivity only high quality pre-school offered benefits for students from a low early years HLE group (ES= -0.40). For those who had a high early years HLE, however, low quality pre-school did not seem to offer extra benefits in terms of predicting better social-behavioural outcomes in Year 9. This pattern fits with predictions made of interactions between home and out-of-home pre-school experiences by Melhuish (1991) and findings of interactions when the EPPSE students were in primary education during Key Stage 2 (Sammons et al., 2008a; 2008b).
In combination with the findings for academic outcomes (Sammons et al, 2011a) the results suggest that higher quality pre-school experiences can have lasting positive benefits for all round development, although by age 14 these effects are relatively modest for social behaviour. We

conclude that pre-school experience on its own, while of benefit, should not be regarded as a magic bullet to overcome the long lasting effects of disadvantage, but may provide help to ameliorate its impact, particularly if of high quality.

Primary school influence

There were no statistically significant effects of the academic effectiveness of the primary school an EPPSE student had attended in terms of predicting better later social-behavioural outcomes at the end of KS3. This is in contrast to findings for academic attainment where we have identified longer term positive benefits from attending a more academically effective primary school that remain statistically significant in predicting academic results in Year 9 (Sammons et al. 2011a).

Secondary school influences

Secondary school academic effectiveness and school quality measured by Ofsted inspection

Two administrative indicators of school effectiveness and quality are provided by i) the DfE Contextual Value Added (CVA) measures calculated to measure secondary school effectiveness in promoting students' academic progress from KS2 to KS4 and ii) the Office for Standards in Education (Ofsted) inspection grades for schools.

EPPSE tested whether students who attended more effective or higher quality secondary schools (as defined by these indicators) in KS3 showed better social-behavioural outcomes.

The four year average CVA score for secondary schools did not predict differences in students' social-behavioural outcomes in KS3 either positively or negatively, when account was taken of the influence of individual student, family, HLE and neighbourhood factors. However, the overall Ofsted inspection judgments of the secondary school for their measure of 'behaviour of learners' did predict better social-behavioural outcomes for EPPSE students. The differences were primarily distinguished between a satisfactory, good or outstanding secondary school and an inadequate one. Students who had the misfortune to attend a secondary school that had been judged inadequate on at least one occasion in the four years studied, by contrast, showed significantly poorer social behaviour, taking into account the influence of other factors (e.g., ES ranged between 0.56 and 0.63 for attending a satisfactory, good or outstanding school versus an inadequate one for 'self-regulation').

As well as identifying a net effect after controlling for other influences, interaction effects were also studied. These showed that attending an 'outstanding' or a 'good' school offered the greatest benefits in promoting better social behaviour outcomes to students with lower scores on the multiple disadvantage index, those from non manual family SES groups and those whose mothers had higher qualification levels. At secondary level therefore, attending a better secondary school seems to have relatively more benefit for those students who are from relatively more advantaged backgrounds compared to those who are relatively more disadvantaged. This is in contrast to findings at younger ages which indicated that the disadvantaged children benefited more from attending higher quality pre-schools and more academically effective primary schools.

School level social composition

School level social composition was measured by the percentage of students' eligible for Free School Meals (FSM) and the percentage of students with SEN. Neither of these aggregate measures were significant predictors of social-behavioural outcomes at KS3. These findings are in contrast to the results for academic outcomes in Year 9 where attending a secondary school with a more disadvantaged intake had a weak but negative impact on EPPSE students' own attainment levels.

Students' experiences and views of secondary school

Homework

Students' self reported time on homework strongly predicted better social-behavioural outcomes in Year 9. This relationship held even when taking into account other individual student, family and HLE influences (2-3 hours per night had ES=0.72 'self-regulation', ES=0.62 'pro-social', ES= -0.71 'hyperactivity' and ES= -0.55 'anti-social'). The positive impact of spending time on homework for social-behavioural outcomes mirrors results found for academic attainment at this age. It mirrors

other research which has pointed to the reciprocal links between behavioural patterns including effort and motivation that predict attainment. Of course it must be recognised that spending time on homework is a form of self-regulated behaviour in itself, and can be seen to demonstrate higher levels of motivation and commitment to school work, and also possible family support and encouragement to take study seriously. Also it is likely that a teacher may be positively influenced by whether a student completes homework when assessing their behaviour and their attainment.

In interpreting this finding it should also be remembered that some schools lay more emphasis on setting and marking homework and thus school processes may also be at work in shaping students' attitudes to and engagement in homework.

Taken together with the positive findings on these students' English, maths and science attainment and their academic progress across KS3 (where significantly better outcomes were predicted by spending more time on homework) the results for social behaviour also point to the benefits of encouraging students to spend time on completing homework. It is likely to foster better study skills and motivation, encourage independent learning and, through the extra time spent on study, increase the opportunity to learn in KS3. Other research reviews on the impact of homework have pointed to its benefits for academic outcomes at secondary level but have rarely explored the relationships with social behaviour (but see Ramdass & Zimmerman, 2011).

Teaching and school processes in KS3

Students' views about their secondary school education in KS3 were obtained from self report questionnaires. Various measures were derived that related to features of their school experiences (Sammons et al., 2011 b).

Where students reported that their schools laid a greater 'emphasis on learning', this predicted better 'self-regulation' (ES=0.17 for imputed data) and to a lesser extent 'pro-social' behaviour (ES=0.16 for imputed data) and reduced negative behaviour also (ES=-0.20 'hyperactivity', ES=-0.16 'anti-social' on imputed data). Elsewhere, we have shown that this 'emphasis on learning' factor (a measure of the quality of teaching derived from the student's perspective) also predicted better educational attainment in KS3, after taking into account other background influences.

'Teacher support' (where students reported teachers supporting their learning) also predicted better social behaviours (e.g., ES=0.17 'self-regulation', ES=-0.20 'hyperactivity'). This factor measures teacher behaviours such as providing helpful comments on students' work, use of praise, formative feedback and making lesson aims clear. It is therefore another measure that relates to the quality of teaching experienced by students.

A 'negative behavioural climate' in the secondary school, as reported by students, also predicted poorer social-behavioural outcomes at age 14. It predicted poorer outcomes in 'self-regulation' (ES=-0.32) and 'pro-social' behaviour (ES=-0.26) and increased scores for 'hyperactivity' (ES=-0.31) and 'anti-social behaviour' (ES=0.25).

Similarly, the factor 'valuing pupils' was found to predict better outcomes for all four social-behavioural measures. This factor captures aspects of the emotional climate of the school, such as relationships with teachers in terms of friendliness and the extent to which students feel valued and involved.

The headteacher's leadership qualities were also important as these predicted better social-behavioural scores for the all four outcomes (ES=0.09 to ES=0.13 for imputed data). Again these findings of weak to modest positive effects are in line with those found in analysing academic outcomes in KS3. The effects were not strong and other literature suggests that 'headteacher leadership' tend to operate indirectly to benefit student outcomes through improving the school behavioural climate, school organisation and teaching quality that may be hypothesised to have a direct impact on student outcomes (see Day et al., 2009; Leithwood et al., 2006; Robinson, 2008; Sammons et al., 2011c).

The higher the quality of the 'physical environment of the school' (attractive buildings, classroom decorations, and standards of cleanliness) predicted better social-behavioural outcomes for 'pro-

social' (ES=0.10) and reduced 'anti-social' behaviour (ES=-0.07), controlling for the influence of other background influences. Similarly 'school learning resources', as rated by students, predicts better outcomes for all four social-behavioural measures (ES=0.12 to ES=0.15 for imputed data). Again though weak these results show that, taking account of other influences, student behaviour tends to be better in secondary schools that are more favourably resourced in terms of science laboratories, the library and the computer resources.

Student dispositions

Previous research has shown that there are reciprocal relationships between academic self-concepts and attainment (Marsh & Craven, 2006). Higher self-concept predicts better attainment and vice versa. Earlier patterns of attainment and self concept can shape students' future identities as learners. EPPSE has shown (Sammons et al., 2011a) strong links between 'academic self-concept in maths' as a predictor of maths attainment in Year 9, although 'academic self-concept in English' was a less strong predictor of Year 9 English attainment. We tested whether these measures that we term students' 'dispositions' also predict differences in their social-behavioural outcomes as rated by teachers in Year 9.

The results indicate stronger positive effects for 'academic self-concept' in maths as a predictor of 'self-regulation' and 'pro-social' behaviour than for 'academic self-concept in English'. In addition, higher scores on these two measures of 'academic self-concept' predicted reductions in negative behaviour for both 'hyperactivity' and 'anti-social' behaviour. Due to the likely reciprocal nature of relationships between academic self-concept, attainment and behaviour it is not possible to infer causal connections. Nonetheless, the results suggest that efforts to improve attainment and academic self concept of students in secondary schools are also likely to promote better social-behavioural outcomes and vice versa.

'Enjoyment of school' can be viewed as an important educational outcome in its own right and contributes to student well-being. 'Enjoyment of school' as reported by students' consistently predicted better social-behavioural outcomes. 'Enjoyment of school' has also been shown to predict better academic outcomes in KS3. These findings are relevant to policy makers and practitioners because they show that improving attainment and social-behavioural outcomes is not at variance with higher levels of student reported 'enjoyment of school'.

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Glossary of terms

Academic self-concept EPPSE derived two measures of Academic self-concept from Year 9 student questionnaire data:

1) 'Academic self-concept for English'
2) 'Academic self-concept for maths'

Both of the above measures are based on items taken from existing well established 'academic self-concept' scales (Marsh, 1990a; 1990b; Marsh & Hau, 2003; Marsh & Craven, 2006).

Age standardised scores Assessment scores that have been adjusted to take account of the pupil's age at testing. This enables a comparison to be made between the cognitive outcome of an individual pupil, and the relative achievement of a representative sample of pupils in the same age group throughout the country or, in this case, the relative achievement of the EPPE sample.

Anxiety A factor derived from Year 9 student questionnaire items that reflect the degree to which the students feel unhappy, worried, nervous, fearful in new situations, or suffer from minor ailments.

'at risk' The term 'at risk' is a complex one which will differ depending on the particular criteria used. For instance, the definition of possible cognitive 'at risk' status used in the ETYSEN study (see Taggart et al., 2006), based on children's cognitive attainment at entry to pre-school, was a score of one standard deviation (sd) below the mean (in standardised assessments) in relation to national norms (at risk). In the more recent EPPSE case studies, there are various definitions of risk and resilience (see Siraj-Blatchford et al., 2011a).

Anti-social behaviour A social-behavioural construct identified from teachers' ratings about EPPSE students, collected through a pupil profile based on Goodman's (1997) Strength and Difficulties questionnaire. Five items formed the factor 'anti-social' behaviour e.g. Steals from home, school or elsewhere.

British Ability Scales (BAS) This is a battery of assessments specially developed by NFER-Nelson to assess very young pupils' abilities. The assessments used at entry to the EPPE study and at entry to reception were:

Block building - Visual-perceptual matching, especially in spatial orientation (only entry to study)
Naming Vocabulary – Expressive language and knowledge of names
Pattern construction – Non-verbal reasoning and spatial visualisation (only entry to reception)
Picture Similarities – Non-verbal reasoning
Early number concepts – Knowledge of, and problem solving using pre-numerical and numerical concepts (only entry to reception)
Copying – Visual–perceptual matching and fine-motor co-ordination. Used specifically for pupils without English
Verbal comprehension – Receptive language, understanding of oral instructions involving basic language concepts.

Birth weight In the EPPSE research, babies born weighing 2500 grams (5lbs 8oz) or less are defined as below normal birth weight; foetal infant classification is below 1000 grams, very low birth weight is classified as 1001-1005 grams and low birth weight is classified as 1501-2500 grams (Scott and Carran, 1989). When EPPSE uses this measure in analyses, the categories foetal infant (<1000g) and very low birth weight (1001-1005g) are often collapsed into one category due to small numbers in the former group.

Centre/School level variance The proportion of variance in a particular child/student outcome measure (i.e. Year 9 English Teacher Assessment level at the end of Key Stage 3 in secondary school) attributable to differences between individual centres/schools rather than differences between individual children/students.

Citizenship values A factor derived from Year 9 student questionnaire items that relate to how important students feel certain behaviours are such as strong people not picking on weak people, respecting rules and laws, controlling your temper, respecting other's views, and sorting out disagreements without fighting.

Comparative Fit Index (CFI) The CFI is an index of a statistical model fit that takes into account sample size. Values close to 0.95 indicate good fit (Hu & Bentler, 1999).

Compositional effects The influence of a student's peer group on that particular student's individual outcomes.. For example, the influence of attending a school where a high percentage of students are in receipt of Free School Meals (FSM) or come from disadvantaged backgrounds. This influence is irrespective of the characteristics (FSM status) of the individual student in question. For further details see Harker (2001).

Confidence intervals (at 95 or 99%) A range of values which can be expected to include the 'true' value in 95 or 99 out of 100 samples (i.e. if the calculation was repeated using 100 random samples).

Contextualised models Cross-sectional multilevel models exploring individuals' outcomes, while controlling for individual, family and home learning environment characteristics (but not prior attainment).

Controlling for Several variables may influence an outcome and these variables may themselves be associated. Multilevel statistical analyses can calculate the influence of one variable upon an outcome having allowed for the effects of other variables. When this is done the net effect of a variable upon an outcome controlling for other variables can be established.

Correlation A correlation is a measure of statistical association that ranges from + 1 to -1.

Cronbach's alpha (α) A measurement of the internal reliability (or consistency) of the items on a test or questionnaire that ranges between 0 and 1 showing the extent to which the items are measuring the same thing (Reber, 1995). A value greater than 0.7 ($\alpha<0.7$) suggests that the items consistently reflect the construct that is being measured.

CVA (Contextualised Value Added) Measures of secondary school academic effectiveness derived from KS2-KS4 contextual value added (CVA) indicators produced by the Department for Education (DfE). At the pupil level, the CVA score was calculated as the difference between predicted attainment (i.e., the average attainment achieved by similar pupils) and real attainment in KS4. The predicted attainment was obtained by using multilevel modelling controlling for pupils' prior attainment and adjusting for their background characteristics (i.e., gender, age, ethnicity, SEN, FSM, mobility etc.). For each school, all individual pupil scores were averaged and adjusted for the proportion of pupils attending the school in a specific year. This final averaged score represents the school level CVA and it is presented as a number based around 1000 (for more technical details see http://www.education.gov.uk/performancetables/schools_08/documents.shtml).

Dispositions An overarching term used to refer to factors such as *'enjoyment of school'*, *'academic self concept (English and maths)'*, *'popularity'*, *'citizenship values'* and *'anxiety'*. The EPPSE study derived these factors from questionnaires completed by students in Year 9 called 'All about Me' and 'All about Me in school'.

ECERS-R and ECERS-E The American Early Childhood Environment Rating Scale (ECERS-R) (Harms et al., 1998) is based on child centred pedagogy and also assesses resources for indoor and outdoor play. The English rating scale (ECERS-E) (Sylva et al., 2003) was intended as a supplement to the ECERS-R and was developed specially for the EPPE study to reflect the Desirable Learning Outcomes (which have since been replaced by the Early Learning Goals, the Curriculum Guidance for the Foundation Stage, and the Early Years Foundation Stage). For more information see Sylva et al., (2010).

Educational effectiveness Research design which seeks to explore the effectiveness of educational institutions in promoting a range of child/student outcomes (often academic measures) while controlling for the influence of intake differences in child/student characteristics.

Effect sizes (ES) Effect sizes (ES) provide a measure of the strength of the relationships between different predictors and the outcomes under study. For further information see Elliot & Sammons (2004).

Emphasis on learning A factor derived from Year 9 student questionnaire items that relate to teacher expectations, emphasis on understanding something not just memorising it, teachers believing that it is okay for students to mistakes as long as they learn from them, students wanting to do well in exams, and lessons being challenging.

Enjoyment of school A factor derived from Year 9 student questionnaire items that reflect the degree to which students reported they like lessons and being at school, like answering questions in class, but also how much the student experiences boredom in lessons or feels school is a waste of time.

Factor Analysis (FA) An umbrella term covering a number of statistical procedures that are used to identify a smaller number of factors or dimensions from a larger set of independent variables or items (Reber, 1995). At KS3 EPPSE used:

- Exploratory FA – a type of analyses where no prior (theoretical) knowledge is imposed on the way the items cluster/load.
- Principal Components Analysis (PCA) – a procedure that converts a set of observations of possibly correlated items into a set of values of uncorrelated items called principal components.
- Confirmatory FA – type of factor analyses used where the measure of a factor/construct are tested against a prior (theoretical) knowledge.

Family characteristics Examples of family characteristics are mother's highest qualification level, father's highest qualification level and family socio-economic status (SES).

Free school meals (FSM) An indicator of family poverty.

General Cognitive Ability (GCA) A measure of pupils' overall cognitive ability, incorporating non-verbal and verbal BAS sub-scales.

Growth Curve Modelling "In brief, the objective of growth curve modeling1 is to describe a set of time-ordered, within-person observations using only a few parameters. For example, the intra-individual change over time, or within-person learning, that occurs with practice might be described parsimoniously by two parameters, one indicating an individual's initial level of ability (e.g., intercept), and another indicating linear rate of increase or decline in performance across multiple occasions of measurement (e.g., linear slope)....Growth curve modeling methods also allow us to describe and test hypotheses about individual differences in intra-individual change. By allowing the parameters used to describe intra-individual change to vary between individuals we can also model and examine how (and potentially why) individuals differ in their initial levels of performance (intercept), rates of improvement or decline over time (linear slope), asymptotic levels of performance, etc. Examining how the inter-individual differences in particular aspects of intra-individual change captured by each parameter relate to other inter-individual differences (e.g., covariates such as trait personality) brings us one step closer to understanding how and why individuals follow different paths of development" (Ram & Grimm, 2007; p. 303).

Headteacher qualities A factor derived from Year 9 student questionnaire items that reflect the headteacher making sure that students behave well, their presence around the school and interest in how much students learn.

Hierarchical nature of the data Data that clusters into pre-defined sub-groups or levels within a system (i.e. students, schools, local authorities).

Home learning environment (HLE) characteristics Measures derived from reports from parents (at interview or using parent questionnaires) about what children do at home (with/independent of their parents). There are several HLE measures: early years HLE, KS1 HLE, KS2 HLE (please see Appendix 4 for further details).

Hyperactivity A social-behavioural construct identified from teachers' ratings about EPPSE students, collected through a pupil profile based on Goodman's (1997) Strength and Difficulties questionnaire. Several items formed the factor 'hyperactivity' e.g. Restless, overactive, cannot stay still for long.

Income Deprivation Affecting Children Index (IDACI) The IDACI represents the percentage of children in each SOA that live in families that are income deprived. For further details see Noble et al., (2008).

Index of Multiple Deprivation (IMD) The IMD is a measure of a range of characteristics evident in a neighbourhood. For further details see Noble et al. (2004; 2008).

Internal Reliability/Consistency The degree to which the various parts of a test (items) or other instrument (e.g. questionnaire) measure the same variables/construct (Reber, 1995). An example measure would be ***Cronbach's alpha*** (see earlier).

Intra-centre/school correlation The intra-centre/school correlation measures the extent to which the outcomes from children/students in the same centre/school resemble each other as compared with those from children/students at different centres/schools. The intra-centre/school correlation provides an indication of the extent to which unexplained variance in children's/students' progress (i.e. that not accounted for by prior attainment) may be attributed to differences between centres/schools. This gives an indication of possible variation in pre-school centre/school effectiveness.

Key Stage (KS) The English education system splits students into age phases known as Key Stages as follows: KS1 (age 5-7), KS2 (8-11), KS3 (12-14), KS4 (14-16).

Mean average A measure of central tendency that is calculated by summing a set of values (or scores) and then dividing by the number of values or scores (Reber, 1995).

Multilevel modelling A methodology that allows data to be examined simultaneously at different levels within a system (i.e. children/students, pre-school centres/schools, local authorities), essentially a generalisation of multiple regression.

Multiple Disadvantage Index of Risk. This measure was developed as part of the Early Years Transition & Special Educational Needs (EYTSEN) Project, which focuses on the identification of children 'at risk' of SEN (see Sammons et al., 2004c). An index was created based on 10 indicators in total: three child variables, six parent variables, and one related to the Early years Home Learning Environment (HLE).

Child variables

- First language: English as an additional language (EAL)
- Large family: 3 or more siblings
- Pre-maturity / low birth weight

Parent/HLE variables

- Mother's highest qualification level: no qualifications
- Social class of father's occupation: Semi-skilled, unskilled, never worked, absent father
- Father not employed
- Young Mother (Age 13-17 at birth of EPPE child)
- Lone parent
- Mother not working / unemployed
- Low Early years Home Learning Environment (HLE)

For further details see Sammons et al., (2002).

Multiple imputation A statistical procedure that replaces missing value with a set of predicted values (Little & Rubin, 1987). This procedure generates several imputed data sets, which are then analysed and the results combined according to Rubin's Rule (Little & Rubin, 1987).

Multiple regression A method of predicting outcome scores on the basis of the statistical relationship between observed outcome scores and one or more predictor variables.

National Assessment Levels The table below shows the levels that could be achieved by a student at different ages in their National Assessments tests / can be awarded to a student for their Teacher Assessment (TA).

Outcome	Key Stage 1 (KS1), Age 7	Key Stage 2 (KS2), Age 11	Key Stage 2 (KS3), Age 14
Reading/ English Levels	Working towards level 1 Level 1 **Level 2 – Expected Level** Level 3 Level 4	Level 1 Level 2 Level 3 **Level 4 – Expected Level** Level 5 Level 6	Level 1 Level 2 Level 3 Level 4 **Level 5 – Expected Level** Level 6 Level 7 Level 8
Maths Levels	Working towards level 1 Level 1 **Level 2 – Expected Level** Level 3 Level 4	Level 1 Level 2 Level 3 **Level 4 – Expected Level** Level 5 Level 6	Level 1 Level 2 Level 3 Level 4 **Level 5 – Expected Level** Level 6 Level 7 Level 8
Science Levels	Working towards level 1 Level 1 **Level 2 – Expected Level** Level 3 Level 4	Level 1 Level 2 Level 3 **Level 4 – Expected Level** Level 5 Level 6	Level 1 Level 2 Level 3 Level 4 **Level 5 – Expected Level** Level 6 Level 7 Level 8

Net effect The unique contribution of a particular variable upon an outcome while other variables are controlled.

Ofsted The Office for Standards in Education, Children's Services and Skills (Ofsted) inspect and regulate services that care for children and young people, and those providing education and skills for learners of all ages. See Matthews & Sammons (2004), and the Ofsted website (http://www.ofsted.gov.uk/content) for further details.

Pedagogical strategies Strategies used by an educator to support learning. These include the face to face interactions with students, the organisation of resources and the assessment practices.

(Poor) behaviour climate A factor derived from Year 9 student questionnaire items that relate to the general behaviour climate in the EPPSE student's school; students being given a hard time by others if they work hard, level of compliance with school rules, fighting and weapons being brought into school, and whether most students want to leave the school as soon as they can.

Popularity A factor derived from Year 9 student questionnaire items that relate to how popular students feel they are with other teenagers and how many friends they have.

Pre-reading attainment Composite formed by adding together the scores for phonological awareness (rhyme and alliteration) and letter recognition.

Pre-school effectiveness Measures of the effectiveness of pre-schools were derived from Value Added (VA) models of the sample's actual progress during pre-school, controlling for prior attainment and children's background characteristics (Sammons et al., 2004a).

Primary school effectiveness Primary school academic effectiveness scores were obtained from National Assessment data for several cohorts across all primary schools in England. Value-added scores were calculated across the years 2002-4, for each primary school in England and then extracted for schools attended by the EPPE sample (Melhuish et al., 2006a; 2006b).

Prior attainment Measures which describe a participant's achievement at the beginning of the phase or period under investigation (i.e. taken on entry to the study or school, or for Year 9 analyses, outcomes from Year 6).

Pro-social Behaviour A social-behavioural construct identified from teachers' ratings about EPPSE students, collected through a pupil profile based on Goodman's (1997) Strength and Difficulties questionnaire. Several items formed the factor 'pro-social' behaviour e.g. Considerate of other people's feelings.

Pupil Profile An instrument containing Goodman's (1997) Strength and Difficulties questionnaire plus some additional items used to collect information about EPPSE student's social behaviour. It is completed by a teacher who knows the EPPSE student well.

Quality of pre-school Measures of pre-school centre quality were collected through observational assessments (ECERS-R, ECERS-E) completed by trained researchers. For further information see ***ECERS*** and Sylva et al. (2010).

Quality of secondary schools Secondary school quality was derived from measures taken from Ofsted inspection judgments. See ***Ofsted*** for further details.

Quality of teaching Measures from Year 5 classroom observations using the IEO (Stipek) and COS-5 (Pianta) instruments. For further information see Sammons et al. (2006a; 2006b).

Root Mean Square Error of Approximation (RMSEA) The RMSEA is an index measure of model; values less than 0.06 are an indication of a good fit.

Sampling profile/procedures The EPPSE sample was constructed of:
Five regions (six Local authorities) randomly selected around the country, but being representative of urban, rural, inner city areas. Pre-schools from each of the 6 main types of target provision (nursery classes, nursery schools, local authority day nurseries, private day nurseries, play groups and integrated centres) randomly selected across the region.

School environment A factor derived from Year 9 student questionnaire items that relate to how EPPSE students view their school in terms of the physical space (the attractiveness of buildings, the decorative state of the classrooms, the condition of the toilets), as well as its reputation as a good school and how well organised it is.

School/learning resources A factor derived from Year 9 student questionnaire items that relate to practical resources for learning at the EPPSE student's school; amount of computers and getting enough time on them in lessons, and the quality of science labs and the school library.

School level variation School level variance here refers to the percentage of variation in students' outcomes that can be attributed to differences between schools.

Secondary school effectiveness Secondary school academic effectiveness scores were obtained from the Department for Education (DfE). The measure of academic effectiveness is represented by the average KS2 to KS4 contextual value added (CVA) school level scores over 4 years (2006-2009) when EPPSE students were in secondary school. See '***CVA***' as this is the same measure.

Self-regulation A social-behavioural construct identified from teachers' ratings about EPPSE students, collected through a pupil profile based on Goodman's (1997) Strength and Difficulties questionnaire. Several items formed the factor 'self-regulation' e.g. Likes to work things out for self; seeks help rarely.

Significance level Criteria for judging whether differences in scores between groups of children/students or centres/schools might have arisen by chance. The most common criteria is the 95% level ($p<0.05$), which can be expected to include the 'true' value in 95 out of 100 samples (i.e. the probability being one in twenty that a difference might have arisen by chance).

Social-behavioural development A student's ability to 'socialise' with other adults and pupils and their general behaviour to others. EPPSE uses this overarching name to refer to a range of social-behavioural outcome measures. At age 14, two of these outcomes refer to positive outcomes ('self-regulation' and 'pro-social' behaviour) and two refer to negative outcomes ('hyperactivity' and 'anti-social' behaviour).

Socio-economic status (SES) Occupational information was collected by means of a parental interview/questionnaire at different time points. The Office of Population Census and Surveys OPCS (1995) Classification of Occupations was used to classify mothers and fathers current employment into one of 8 groups: professional I, other professional non manual II, skilled non manual III, skilled manual III, semi-skilled manual IV, unskilled manual V, never worked and no response. Family SES was obtained by assigning the SES classification based on the parent with the highest occupational status.

Standard deviation (sd) A measure of the spread around the mean in a distribution of numerical scores. In a normal distribution, 68% of cases fall within one standard deviation of the mean and 95% of cases fall within two standard deviations.

Structural equation modelling (SEM) is an umbrella term for statistical modelling techniques which allow for testing causal processes and structural relationships (Byrne, 2010).

Student background characteristics Student background characteristics include age, birth weight, gender, and ethnicity.

Target centre A total of 141 pre-school centres were recruited to the EPPSE research covering 6 types of provision - ***Sampling profile/procedures***. The sample of students was drawn from these target centres.

Teacher Assessment (TA) These assessments made by teachers provide measures of students' educational outcomes for English, maths and science in Year 9 (age 14) in the form of National curriculum levels.

Teacher discipline A factor derived from Year 9 student questionnaire items that relate to the level of teacher control during lessons, in terms of behaviour, noise, rule breaking and teachers being bothered if students turn up late.

Teacher support A factor derived from Year 9 student questionnaire items that relate to support given by teachers in terms of helping students, giving them feedback, making them feel confident about their work, rewarding them for good behaviour, being available to talk privately, and marking and returning homework.

Term of birth Using EPPSE student's dates of birth, the EPPSE sample were categorised into three 'term of birth' categories: Autumn born (September to December); Spring born (January to April); Summer born (May to August).

Total BAS score By combining 4 of the BAS sub-scales (2 verbal and 2 non-verbal) a General Cognitive Ability score or Total BAS score at entry to the study can be computed. This is a measure of overall cognitive ability.

Value added models Longitudinal multilevel models exploring individuals' progress over time, controlling for prior attainment as well as significant individual, family and home learning environment characteristics.

Value added residuals (pre-school effectiveness) Differences between predicted and actual results for pre-school centres (where predicted results are calculated using value added models). See ***Pre-school effectiveness*** for further information.

Value added residuals (primary school academic effectiveness) Differences between predicted and actual results for primary schools measuring pupil progress across KS1 – KS2. For further information see ***Primary school effectiveness*** and Melhuish et al., (2006a; 2006b).

Valuing students A factor derived from Year 9 student questionnaire items that relate to whether the school values students' views, teachers listen to students views, are respectful and friendly to students, teachers are unpleasant to students if they make mistakes.

Views of school An overarching term used to refer to factors such as 'teacher support', 'school environment', 'valuing students', 'headteacher qualities', 'poor behaviour climate', 'emphasis on learning', 'teacher discipline', and 'school/learning resources'. The EPPSE study derived these factors from the questionnaire completed by students in Year 9 called 'All about Me in school'.

APPENDIX 1: Additional notes on the distribution of the sample.

Notes: (1) The 'Valid sample' and 'Missing data' subsamples are defined based on the distribution of the dependent variables (social-behavioural outcomes in Year 9). Accordingly, the entries corresponding to the 'Valid sample' represent observations that have valid values both on the dependent variables and the considered predictor variable. Entries in the 'Missing data' column designate observations that have valid values on the predictor variable but missing values on the dependent outcomes in Year 9. Finally, the difference between the total number of observations retained for the purpose of multiple imputation (= 2,926 students, i.e. the number of students who simultaneously had valid data for at least three time points over the interval spanning from Reception to Year 9, and a minimum of 75% of the indicators for each dependent outcome + Year 9), and the sum of the totals corresponding to the valid sample and the missing data, represents the number of observations with missing values on both the considered predictor and the social-behavioural outcomes in Year 9. Entries highlighted in bold font indicate the total number of observations for the respective predictor within each subsample.

(2) Average absolute and relative frequencies, respectively, corresponding to 10 multiply imputed datasets.

(3) Some of the predictor variables, among which quality judgments issued in conjunction with Ofsted inspections, are not multiply imputed for substantive rationales. Hence the reduced sample size for the imputed data, and the mathematical equivalence between the average number of observations for the 10 multiply imputed datasets, and the sum of observations for the valid sample and missing data, within each predictor category.

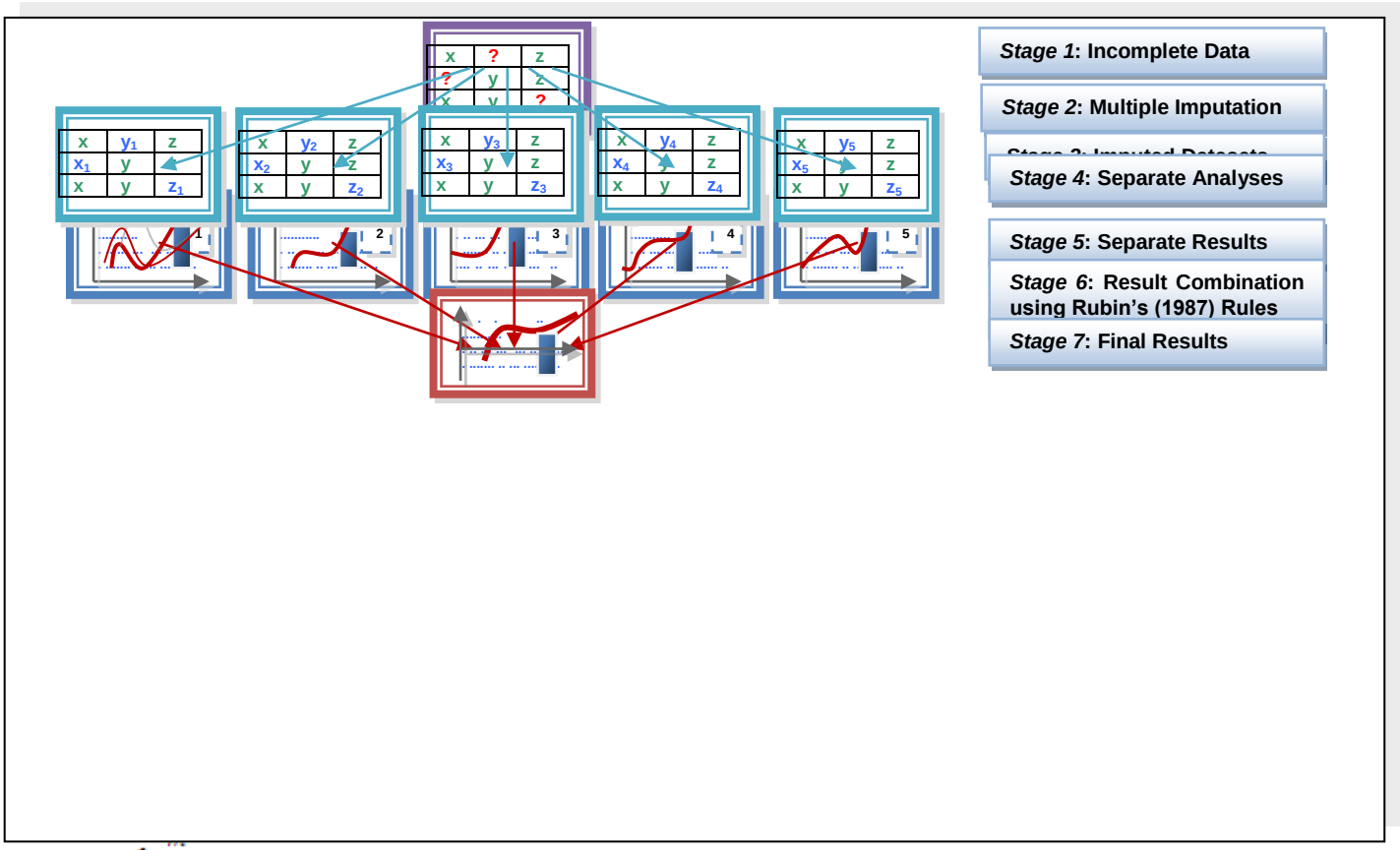
APPENDIX 2 The Multiple Imputation Procedure

Multiple imputation[26] is a simulation-based approach to analyzing incomplete data aimed at addressing the statistical biases incurred by data missingness. The ultimate goal of any statistical analysis is to produce valid statistical inferences regarding a population of interest. Missing data potentially threatens the objective of inferential validity, particularly if the available sample has different characteristics than the population from which it was drawn and to which the statistical inferences purport to apply. Multiple imputation is considered to produce more valid inferences regarding the statistical associations in the data by producing less biased estimates compared to ad-hoc methods such as pairwise deletion, listwise deletion (complete-case analysis), or single imputation procedures such as mean substitution or last observation carried forward, and therefore increasingly advocated among researchers in the field of social sciences.

The multiple imputation procedure consists in data augmentation resulting in a full rectangularization of the dataset, i.e. a set of complete data matrices amenable to analysis using conventional statistical techniques. Essentially, several replicas of the original dataset are created through simulation, whereby missing data points are substituted by plausible values as determined by the statistical relationships with other variables posited in the specification of the imputation model (see Little & Rubin, 2002). Statistical analyses are then conducted separately on each of the imputed datasets, and the estimates are subsequently pooled (i.e., averaged) across these datasets using Rubin's (1987) rules. A stylized representation of the multiple imputation procedure is provided in Figure A.2.1.

[26] This Appendix draws heavily upon an internal EPPSE methodological report (Sammons et al., 2010).

FIGURE A.2.1: The Multiple Imputation Procedure: A Stylized Representation



$$\bar{Q} = \frac{1}{m}\sum_{i=1}^{m} \hat{Q}_i$$

(Equation A.2.1)

where $\widehat{Q_i}$ is the point estimate of the parameter of interest for the i^{th} multiply imputed dataset.

The overall variances of the parameters of interest are a function of both a within-imputation and a between-imputation variance component, to take into account variability within each multiply imputed dataset and across datasets.

The within-imputation variance component is given by:

$$\bar{U} = \frac{1}{m}\sum_{i=1}^{m} U_i$$

(Equation A.2.2)

where Ui is the variance of the parameter of interest for the i^{th} multiply imputed dataset.

The between-imputation variance is calculated as the product between the sum of squared deviations of the parameter of interest from the overall MI estimate obtained for each dataset, and a multiplier (having numerator 1 and denominator equal to the number of multiply imputed datasets minus 1).

$$B = \frac{1}{m-1}\sum_{i=1}^{m} [(\hat{Q}]_i - \bar{Q})^2$$

(Equation A.2.3)

The total variance *T* is given by the sum of the within-imputation variance and the product of the between-imputation variance and a multiplying factor, as formalized in Equation A.2.4 below:

$$T = \bar{U} + \left(1 + \frac{1}{m}\right)B$$

(Equation A.2.4)

Given that the standard error of a parameter estimate equals the square root of its variance, the overall standard error equals the square root of the total variance:

$SE = \sqrt{T}$ *(Equation A.2.5)*

Substituting Equation A.2.4 into Equation A.1.5 yields

$$SE = \sqrt{\bar{U} + \left(1 + \frac{1}{m}\right)B}$$

(Equation A.2.6)

which is the formula that available multiple imputation software packages (for the purposes of our analyses the Stata -mi estimate- command) implement for computing averaged standard errors corresponding to the overall MI parameter estimates.

In order to make an informed choice of statistical software and multiple imputation procedure implementation, we have tested experimentally the relative performance of various available procedures, by comparing the estimates for two growth curve models (one for self-regulation, and one for anti-social behaviour) against the estimates obtained on a complete-case dataset.

⇨ the standard -**mi impute/ mi estimate**- routine in **Stata 11.2** (StataCorp, 2009);

⇨ the user-contributed package -**ice**- (Royston, 2004) in **Stata 11.2** ;

⇨ the '**mi**' package (Su, Gelman, Hill & Yajima, 2011) in **R 2.1.3.0** (R Development Core Team, 2009);

⇨ the '**mice**' package (Van Buuren & Oudshoorn, 2000) in **R 2.1.3.0**;

⇨ **Amelia II** (Honaker, King, & Blackwell, 2009) [27] in **R 2.1.3.0** (also available as standalone package relying on a graphical user interface);

⇨ **PROC MI/ PROC MIANALYZE** in **SAS 9.2** (SAS Institute Inc., 2008).

An overview of the tested packages, with references to their developers, technical documentation, underlying statistical assumptions, implemented method, and available diagnostic tools, is provided in Table A.1.1 below.

[27] Also available as a standalone package relying on on a graphical user interface.

TABLE A.2.1: Multiple Imputation Procedures Tested

MULTIPLE IMPUTATION SOFTWARE	DEVELOPER(S) / DOCUMENTATION	STATISTICAL ASSUMPTIONS & IMPLEMENTED METHOD	DIAGNOSTIC TOOLS
STATA 11.2: **ice**	Royston, P. (2004). "Multiple imputation of missing values". *Stata Journal*, Vol. 4, No. 3, pp. 227-241. http://www.stata-journal.com/sjpdf.html?articlenum=st0067 *Note*: The Stata implementation of the chained equations approach will also be available as standard routine in the newly released version 12, for further details see http://www.stata.com/stata12/multiple-imputation/	Conditional distribution. Chained equations.	Not available yet, will be available in official Stata 12 release.
STATA 11.2: **mi impute/ mi estimate**	StataCorp (2009). *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP. A copy of the reference manual is available online here http://www.agecon.ksu.edu/support/Stata11Manual/mi.pdf	Joint multivariate normal distribution (mvn option). MCMC Algorithm.	Diagnostic plots: worst linear function (WLF), autocorrelation plot
R 2.1.3.0: **mice**	Van Buuren, S. & Oudshoorn, K. (2000). "Multivariate Imputation by Chained Equations: MICE V1.0 User's manual". Report PG/VGZ/00.038, TNO Prevention and Health, Leiden. http://www.stefvanbuuren.nl/publications/MICE%20V1.0%20Manual%20TNO00038%202000.pdf Van Buuren, S. & Groothuis-Oudshoorn, K. (2010). "MICE: Multivariate Imputation by Chained Equations in R". *Journal of Statistical Software*, pp. 1-68. http://www.stefvanbuuren.nl/publications/MICE%20in%20R%20-%20Draft.pdf http://cran.r-project.org/web/packages/mice/mice.pdf	Conditional distribution. Chained equations.	Plots for assessing model convergence.
R 2.1.3.0: **mi**	Su, Y-S., Gelman, A., Hill, J., & Yajima, M. (2011, forthcoming). "Multiple Imputation with Diagnostics (mi) in R: Opening Windows into the Black Box". *Journal of Statistical Software*. http://www.stat.columbia.edu/~gelman/research/published/mipaper.pdf http://cran.r-project.org/web/packages/mi/mi.pdf	Conditional distribution. Chained equations.	A range of diagnostic plots, including histograms, residual vs predicted plots, average residual vs expected values plots
R 2.1.3.0: **Amelia II**	Honaker, J., King, G., & Blackwell, M. (2009) *AMELIA II: A Program for Missing Data*. http://gking.harvard.edu/amelia/ Repository URL: http://r.iq.harvard.edu/src/contrib/ http://r.iq.harvard.edu/docs/amelia/amelia.pdf *Note*: Also available as standalone package, graphical user interface	Estimation-Maximization (EM) algorithm.	Diagnostic plots including relative densities plots, observed versus imputed values plots. Multiple overimputation.
SAS 9.2: **PROC MI/ PROC MIANALYZE**	SAS Institute Inc. (2008). SAS/STAT® 9.2 User's Guide. Cary, NC: SAS Institute Inc. http://support.sas.com/documentation/cdl/en/statugmi/61805/PDF/default/statugmi.pdf	Joint multivariate normal distribution. MCMC Algorithm.	Diagnostic tools such as trace plots, autocorrelation plots.

Although both Amelia II in R and the user-contributed package -ice- in Stata performed very well, we have opted for the Stata implementation of the chained equations approach. Several reasons have informed our choice. First, a large number of the variables in our dataset were discrete, i.e., measured on a binary, ordinal or categorical scale (for instance, the over 50 behavioural indicators used for operationalizing our dependent variables are measured on ordinal scales; socioeconomic status and parental educational qualifications were categorical variables), thus exhibiting significant departures from Normality. This implied that the assumption of a joint multivariate distribution was unwarranted for these variables. The chained equations approach, owed to its flexibility in allowing the specification of conditional distributions for the missing data, enabled us to customize the regression equation for each incomplete variable in the imputation model using the relevant predictors and the appropriate regression technique given the distributional properties of the variable (e.g., linear regression for continuous variables, binary logistic regression for dichotomous variables, ordinal logistic regression for variables measured on an ordinal scale, and multinomial logistic regression for variables measured on a categorical scale, respectively).

APPENDIX 3: Structural Equation Modelling

By using structural equation confirmatory factor analysis (SEM CFA), we have been able to create better measures of our dependent variables.[28]

We shall briefly explain the main representational conventions in structural equation modelling (SEM), with specific reference to the particularities of the statistical software AMOS (Arbuckle, 2007), used for our analyses. Structural equation models are graphically represented through a number of geometric symbols arranged in a spatial configuration (termed 'path diagram') whereby the processes underpinning statistical relationships among variables are formalized. By convention, variables enclosed by ellipses represent latent or unobserved factors, whereas rectangles contain observed or measured variables.[29] Unidirectional arrows represent the direct (unmediated) impact of one variable upon another, while double-headed arrows indicate covariances (or, in the standardised version, correlations) between pairs of variables. The parameters enclosed within circles correspond, depending on the type of variable to which they are linked, to either measurement errors associated with an observed variable, or to residual error in the equation predicting an unobserved factor, respectively (see Bentler, 1980; Byrne, 2010; Hox, 2010). The core foundational element in an SEM model is a linear (by assumption) regression equation (Bentler, 1980, p. 421). A path diagram can therefore be said to be a stylized representation of a system of simultaneous linear equations formalizing hypothesized statistical relationships among a set of observed and latent variables, and corresponding ancillary parameters. The general SEM model is composed of two parts: a *measurement portion*, and a *structural portion* (Byrne, 2010). The model posited for the operationalisation of our dependent variables is equivalent to a confirmatory factor analysis (SEM CFA), and accordingly the parameters displayed by AMOS along the unidirectional arrows running from latent factors to the endogenous observed variables represent *factor loadings*. In the structural portion of a model, single-headed arrows represent *linear regression coefficients* measuring the impact of one variable on another; in our particular case, the structural portion of the model solely consists of the covariances between the exogenous variables (latent factors). Parameters attached to the bidirectional arrows indicate the values of the covariances between the considered pair of variables (which may be observed or latent variables, or ancillary parameters, such as measurement errors or residuals terms in the prediction of an unobserved factor).[30] Since FIML presupposes the estimation of means and intercepts, the parameters displayed on the top of the rectangles enclosing observed variables represent the (standardised) sample means of the considered variable.[31]

The graphical representation of the structural equations confirmatory factor analysis model in Figure 3.1.1 conveys several important notions. First, the measurement of dependent variables (latent factors) of interest (self-regulation, pro-social behaviour, hyperactivity, and anti-social behaviour) is expressed through a series of structural equations, rather than being specified as linear additive combinations of the items that enter their composition. Second, the various observable behavioural manifestations recorded by the survey instrument (used as measured variables in the model) are to an unequal extent related to the latent factors, as indicated by the varying magnitude of the factor loadings. Third, by allowing for covariances among the latent factors, we are implicitly relaxing the assumption that the latent social-behavioural outcomes we attempt to measure are unrelated to one another. SEM CFA takes a hypothesis-testing approach, and the empirical results do seem to lend support to the validity of this set of implicit assumptions underpinning our model, clearly indicating that the alternative assumptions positing equal influence of indicator variables and orthogonally of factors would have been untenable. Consequently, in devising operational measures of our

[28] We assigned regression weights reflecting the influence of each item on the latent factor under consideration when computing latent factor scores

[29] Following common practice in the theoretical and applied quantitative literature related to structural equation modelling, we are treating the qualifiers '*latent*', '*unmeasured*', '*unobserved*', and '*underlying*', as terminologically equivalent; similarly, the terms '*observed*', '*manifest*', and '*measured*' will be used interchangeably throughout the present report. See for instance Hox (2010); Byrne (2010).

[30] In our particular measurement model, the disturbance terms (eS1, eS2, ..., eA5), representing measurement errors associated with the manifest variables, are not in all cases independent from one another. In order to model this property statistically, we adjusted the measurement model to include covariance parameters between pairs of error terms wherever tests indicated that such parameters are statistically distinct from zero and result in a better goodness of fit of the overall model.

[31] Since we are reporting the standardised estimates from the performed SEM CFA analysis (as unstandardised estimates are contingent on the measurement scales of the variables, and as such they are not intercomparable), our commentary is worded to reflect the substantive interpretation associated with this type of estimates.

dependent variables of interest, we will need a combination of observed indicators that allows for proportional weighting and thereby more closely approximates the underlying theoretical concepts that we purport to measure.

In order to verify whether the measurement of our latent variables is psychometrically sound, we inspected a series of goodness-of-fit statistics. The measurement model reported in Figure 3.1.1 yielded a Chi-square statistic that indicated this was the best fitting model among the tested ones ($\chi^2 =$ 2990.576, df=431, p=.000). The values of the Root Mean Square Error of Approximation (RMSEA) which is recognized as being one of the most informative criteria in in covariance structured modelling (Byrne, 2010), is .043 for our model[32], whereas the Normed Fit Index (NFI) is .91.[33] These values are well within the conventional range of acceptability.

Factor score weights, which are essentially regression coefficients indicating to what extent changes in the observed variables are associated with changes in the latent factors, were used to generate numerical scores corresponding to our dependent variables of interest. In terms of scale directionality, larger values indicate higher levels of the considered social-behavioural outcome in all four cases.

[32] RMSEA values of less than 0.5 indicate a good model fit.
[33] The coefficient values for the NFI range from 0 to 1, with values close to .95 indicating superior fit (see Bryne, 2010).

APPENDIX 4: Computation of Effect Sizes

To illustrate the impact of different background characteristics on student dispositions, effect sizes (ES) were calculated. Effect sizes are most commonly used in experimental studies and essentially measure the strength of mean differences. Glass et al., (1981) define ES as:

ES = (mean of experimental group)-(mean of control group)/pooled standard deviation

Or

$$\Delta = \frac{\mathbf{X_{Exp} - X_{Cont}}}{\mathbf{SD_{Pooled}}}$$

Effect sizes were calculated for different child outcomes, using both the child level variance and coefficients for predictors included in the multilevel statistical models adopting the formulae outlined by Tymms et al. (1997).

For categorical predictors (e.g. gender or ethnicity) the effect size was calculated as:

ES = categorical predictor variable coefficient ⁄√child level variance

Or

$$\Delta = \frac{\beta_1}{\sigma_e}$$

For continuous predictor variables (e.g. child age in months), the effect size describes the change on the outcome measure produced by a change of +/-one standard deviation on the continuous predictor variable, standardised by the within school SD, adjusted for covariates in the model – the level 1 SD:

$$\Delta = \frac{2\beta_{1*\mathbf{SD_{X_1}}}}{\sigma_e}$$

where x_1 represents a continuous predictor variable.

Effect sizes can be useful for comparisons between different studies but interpretations must be made with caution and with reference to the outcomes concerned and controls used in models (Elliot & Sammons, 2004). For further discussion of effect sizes see Coe (2002). Effect sizes for some categorical measures in the EPPE research are large but apply to small numbers of children (e.g. the very low birth weight group or specific ethnic groups).

APPENDIX 5: Variations across secondary schools in students' social-behavioural scores in Year 9

After having examined the individual level variations in social-behavioural outcomes at the end of Key Stage 3 variations that occur at the level of secondary schools were explored. However due to the small number of students in the EPPSE sample in individual secondary schools the results are interpreted with caution and the nature of the data set does not allow us to examine individual school effects with any detail. Tables A.5.1 – A.4.4 below report the estimates from a series of hierarchical one-way analysis-of-variance (ANOVA) models with random effects (Raudenbush & Byrk, 2002; Hox, 2010) (also termed "null" or "empty" model due to the absence of predictor variables in the model specification) for social-behavioural outcomes in Year 9. Essentially, this type of hierarchical linear model rests on the estimation of solely an intercept[34] in the fixed portion of the model, which is equivalent to the mathematical expectation of the dependent variable, or simply the grand mean within the population of interest (average level of considered social-behavioural outcome across secondary schools, prior to controlling for any predictors). This type of model also allows for the identification of the secondary-school specific deviations around this mean, as captured in the level-2 variance components, as well as the student-specific deviations from the average of their school (see e.g., Snijders & Bosker, 1999). Of primary interest for the purposes of this subsection are the random-effects parameters, specifically the secondary-school level (level-2) departures from the grand mean, and the variance components at student-level (level 1), measuring departures of students' scores from their school average; due to the applied standardisation procedure in the measurement of the dependent variables, the grand mean is not of substantive interest here, as it will typically hover around the value of 100 (by mathematical necessity), and neither will be the total amount of variance, as a value of approximately 225 (= 15^2, or the square of the sample standard deviation) is to be expected. Positive departures in the school-level residuals indicate that a particular secondary school has higher-than-average levels, while negative departures signal lower-than-average levels, of the considered social-behavioural outcome.

Self-regulation. Results for self-regulation in Year 9 can be inspected in Table A.4.1.

TABLE A.5.1: Hierarchical Linear Model (One-Way ANOVA with Random Effects) for Self-Regulation in Year 9 (Latent factor scores derived on the basis of structural equations confirmatory factor analysis, IQ-standardized)

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized] One-Way ANOVA with Random Effects						
	VALID SAMPLE			IMPUTED DATA (Stata ICE)		
	Estimate	Sig.	Std. Error	Estimate	Sig.	Std. Error
FIXED-EFFECTS PARAMETERS						
Intercept	99.971	***	0.470	100.016	***	0.351
RANDOM-EFFECTS PARAMETERS						
Variance (Level 2)	16.006	***	2.553	16.236	***	1.862
Variance (Level 1)	209.209	***	4.160	209.142	***	2.979
Total Variance	225.214			225.379		
Number of Level-1 Observations	1508			2930		
Number of Level-2 Units	444			775		
Deviance (-2 x Log Restricted-Likelihood)	12424.79			.		
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.071			0.072		
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*						

Dispersion among secondary schools in terms of self-regulation scores assigned by teachers to students amounts to an estimated variance of between 16.006 (valid sample) and 16.236 (imputed data); in other words, the standard deviation of the school averages from the grand mean is approximately 4. As indicated by the intraclass correlation (ICC) coefficient[35], 7.1% (or 7.2%, according to the estimation based on the multiply imputed data) of the variation in students' self-regulation scores is attributable to secondary schools, while the remainder of 92.9% of the variation

[34] The intercept is the constant term in a regression analysis, i.e., the level of a dependent variable *y* when the level of a predictor variable *x* equals zero.

[35] In the context of a hierarchical *linear* model, the variance partitioning coefficient (VPC) and the intraclass correlation (ICC) are equivalent statistical parameters. Conversely, in models where the dependent variable is dichotomous or discrete, these parameters will be different.

is accounted for by individual differences among students. The highly significant (p<.001) level-2 variance parameter signals that the data configuration entailing a clustering of students within secondary school warrants the incorporation of level-2 parameters and the application of hierarchical modelling techniques. As we shall see, this observation holds for all four investigated social-behavioural outcomes.

For enhanced clarity of our empirical findings, we resorted to the computation of posterior predicted values for the secondary-school specific (level-2) residuals and corresponding standard errors, and constructed 95% confidence intervals to reflect the statistical uncertainty surrounding the level-2 residual estimates. We then applied a simple data visualization technique commonly employed in educational research based on multilevel modelling, i.e. residual versus rank of residual plots (popularly referred to as "caterpillar plots").

FIGURE A.5.5: Variations in Self-Regulation Scores Across Secondary Schools in Year 9: Level-2 Residual vs. Rank of Residual Plot, with Corresponding 95% Confidence Interval Error Bars (Valid Sample)

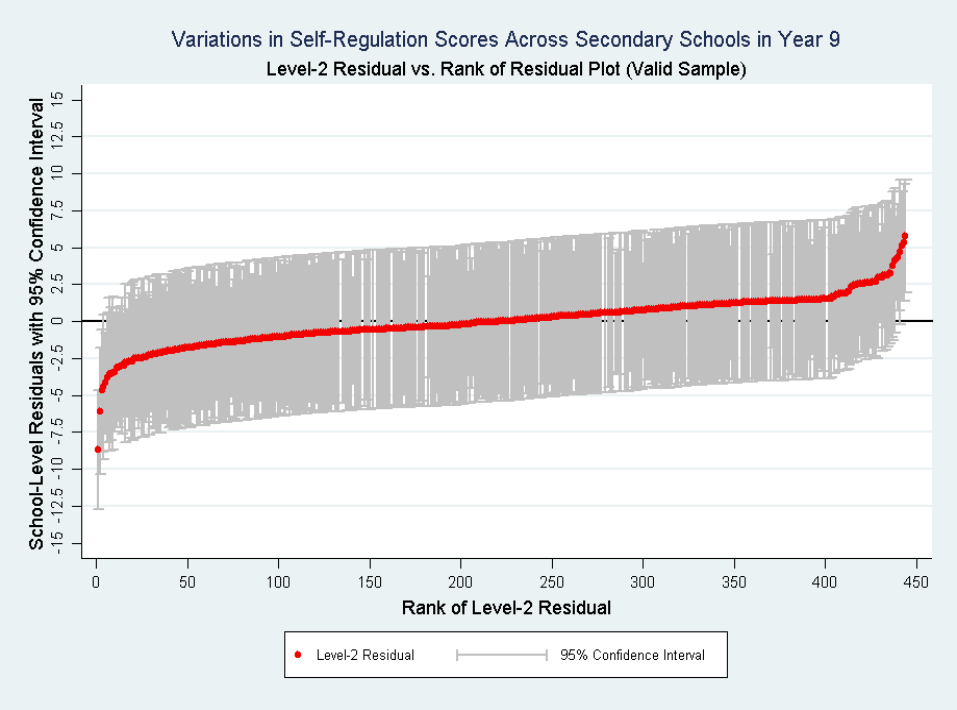


Figure A.5.5 shows that departures of secondary school averages from the grand mean vary (on average) between approximately -8.5 and +6, i.e. between 0.57 standard deviations below and 0.40 standard deviations above the grand mean. Less than 1% of the secondary schools in our Year 9 sample appear to be positioned significantly above or significantly below average in terms self-regulation scores[36]. When factoring in the standard error parameters, the potential school-level differentials could range between approximately -12.6 and 9.75; in other words, the difference in average self-regulation scores between schools could reach a maximum value of 22.35, which is equivalent to approximately 1.5 standard deviations from the grand mean.

By a simple mathematical exercise, the secondary school-level average self-regulation scores can be retrieved; these are calculated by the addition of the grand mean (approx. 100) to the value of residual. Accordingly, the maximum school average appears to be located around 106 (+/- 2.75), while the minimum school average is situated around the value of 91.5 (but could be as low as roughly 87.75).

Pro-social behaviour. Turning to the secondary school differences in terms of pro-social behaviour, it can be observed in Table A.5.2 below that the results for the two types of data are slightly different, especially when set in connection with the results for self-regulation.

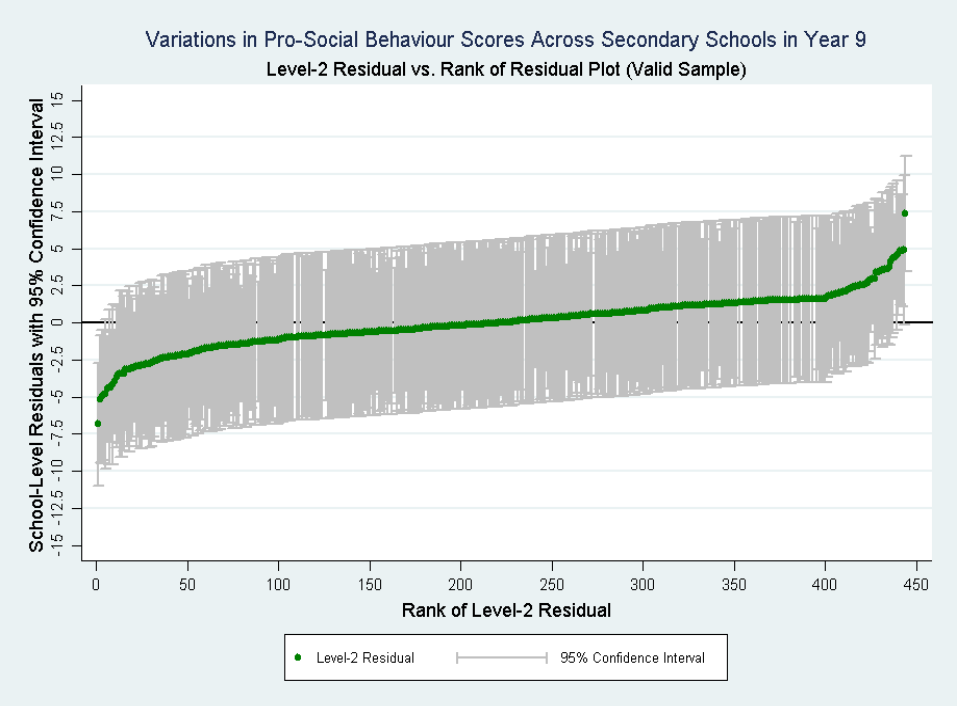
[36] Due caution is urged in the interpretation of these results, as some secondary schools contain no more than one student.

TABLE A.5.2: Hierarchical Linear Model (One-Way ANOVA with Random Effects) for Pro-Social Behaviour in Year 9 (Latent factor scores derived on the basis of structural equations confirmatory factor analysis, IQ-standardized)

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized] One-Way ANOVA with Random Effects						
	VALID SAMPLE			IMPUTED DATA (Stata ICE)		
	Estimate	Sig.	Std. Error	Estimate	Sig.	Std. Error
FIXED-EFFECTS PARAMETERS						
Intercept	99.956	***	0.476	99.964	***	0.348
RANDOM-EFFECTS PARAMETERS						
Variance (Level 2)	17.620	***	2.826	15.545	***	1.907
Variance (Level 1)	208.038	***	4.194	210.052	***	3.000
Total Variance	225.659			225.597		
Number of Level-1 Observations	1508			2930		
Number of Level-2 Units	444			775		
Deviance (-2 x Log Restricted-Likelihood)	12423.95			.		
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.078			0.069		
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*						

Thus, the estimate for the level-2 variance is 17.620 on the non-imputed data, and 15.545 on the imputed data, which implies that on the valid sample a slightly higher amount of variation in pro-social behaviour (7.8%) is accounted for by secondary schools, compared to self-regulation (7.1%, as previously seen). Conversely, according to the imputed data, self-regulation registers a higher level dispersion across secondary schools compared to pro-social behaviour (7.2% as compared to 6.9%, respectively).

FIGURE A.5.6: Variations in Pro-Social Behaviour Scores Across Secondary Schools in Year 9: Level-2 Residual vs. Rank of Residual Plot, with Corresponding 95% Confidence Interval Error Bars (Valid Sample)



Significantly positive or negative departures from the grand mean in terms of pro-social behaviour are registered in a very small fraction of secondary schools, as Figure A.5.6 illustrates. The standardised score for the school where students exhibit the highest average levels of pro-social attitudes is approximately 107.5, i.e. located at a half of a standard deviation above the mean across all secondary school students in our sample, and could reach a value of up to approximately 111.25 when standard errors are taken into account, which in substantive terms would imply that the average student in that school is positioned in the top 25% students across all secondary schools. The secondary school with the lowest average levels of pro-social behaviour is symmetrically located at nearly one half of a standard deviation below the average across all schools; *mutatis mutandis*, it

can analogously be determined that assuming the lowest possible school mean allowed by the value of the standard error (i.e. almost 88.75), the average student in that school is placed in the lowest 25% across all secondary schools in terms of pro-social behaviour.

Hyperactivity is the outcome with the highest level of dispersion across secondary schools according to the estimates produced on the valid sample, and one of the lowest judging by the parameters obtained on the imputed data.

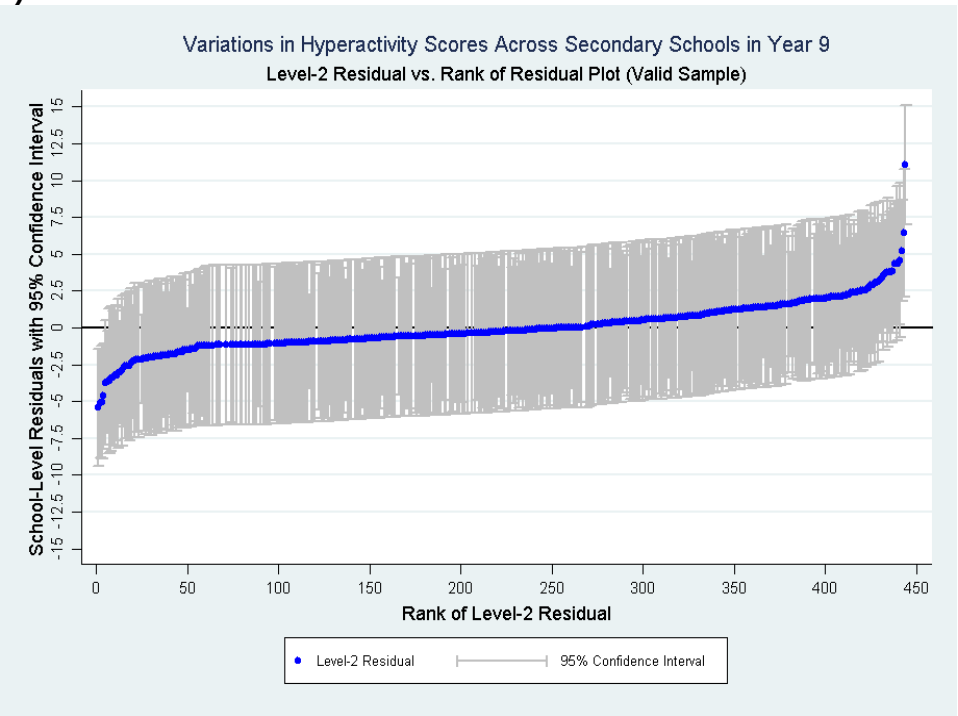
TABLE A.5.3: Hierarchical Linear Model (One-Way ANOVA with Random Effects) for Hyperactivity in Year 9 (Latent factor scores derived on the basis of structural equations confirmatory factor analysis, IQ-standardized)

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized] One-Way ANOVA with Random Effects						
	VALID SAMPLE			**IMPUTED DATA (Stata ICE)**		
	Estimate	**Sig.**	**Std. Error**	**Estimate**	**Sig.**	**Std. Error**
FIXED-EFFECTS PARAMETERS						
Intercept	99.919	***	0.471	99.982	***	0.342
RANDOM-EFFECTS PARAMETERS						
Variance (Level 2)	16.407	***	2.493	13.893	***	1.758
Variance (Level 1)	208.780	***	4.132	211.496	***	3.005
Total Variance	225.187			225.389		
Number of Level-1 Observations	1508			2930		
Number of Level-2 Units	444			775		
Deviance (-2 x Log Restricted-Likelihood)	12423.66			.		
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.073			0.062		
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*						

Accordingly, the proportion of variance in the hyperactivity scores accounted for by secondary schools is approx. 7.3% in valid sample, and only 6.2% (ICC=0.062) on the multiply imputed data. This does not modify the substantive interpretation to any radical extent, but does seem to indicate that some of the school-level variations apparent on the non-imputed data may in fact be attributable to individual students.

Figure A.5.7 is a graphical representation of the secondary school averages in terms of students' hyperactivity levels on the valid sample. As it can be observed, the highest school average is located around 111.5, and could be up to one standard deviation higher than the average for all secondary schools considered together. Given that the 75th percentile for hyperactivity scores is, as previously seen, 109.84, this implies that the average student in such an extreme school is in all likelihood positioned among the 25% most hyperactive students across all investigated secondary schools. The lowest school average is approx 94.5 (=100-5.5), and could be, at its lowest, situated at nearly 2/3 of a standard deviation below the grand mean.

FIGURE A.5.7: Variations in Hyperactivity Scores Across Secondary Schools in Year 9: Level-2 Residual vs. Rank of Residual Plot, with Corresponding 95% Confidence Interval Error Bars (Valid Sample)



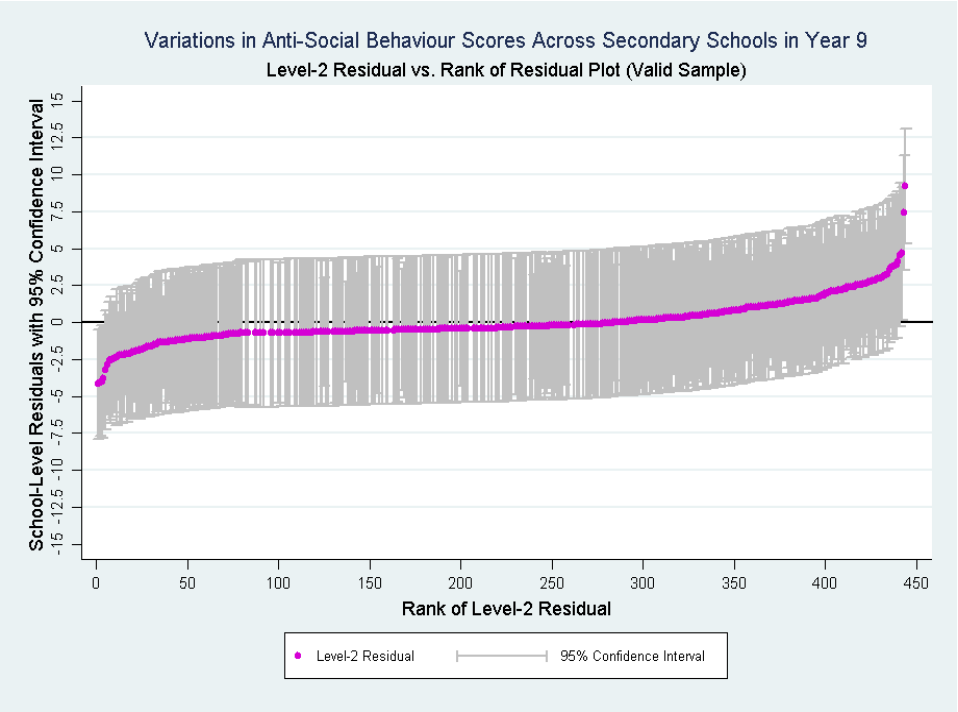
Anti-social behaviour. The hierarchical one-way ANOVA analysis in Table A.5.4, considered in relationship to previous findings in this section, appears to suggest that secondary schools differ more markedly in the levels of self-regulation, pro-social behaviour, and hyperactivity of their students than in the levels of anti-social behaviour they exhibit. This observation is borne out both by the estimates for the valid and those for the imputed data.

TABLE A.5.4: Hierarchical Linear Model (One-Way ANOVA with Random Effects) for Anti-Social Behaviour in Year 9 (Latent factor scores derived on the basis of structural equations confirmatory factor analysis, IQ-standardized)

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized] One-Way ANOVA with Random Effects						
	VALID SAMPLE			**IMPUTED DATA (Stata ICE)**		
	Estimate	**Sig.**	**Std. Error**	**Estimate**	**Sig.**	**Std. Error**
FIXED-EFFECTS PARAMETERS						
Intercept	100.010	***	0.461	100.056	***	0.336
RANDOM-EFFECTS PARAMETERS						
Variance (Level 2)	13.740	***	2.416	11.944	***	1.839
Variance (Level 1)	211.589	***	4.192	213.412	***	3.097
Total Variance	225.329			225.356		
Number of Level-1 Observations	1508			2930		
Number of Level-2 Units	444			775		
Deviance (-2 x Log Restricted-Likelihood)	12430.66			.		
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.061			0.053		
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*						

Thus, less variation across secondary schools compared to any of the other investigated social-behavioural outcomes is recorded in terms of anti-social behaviour (6.1% for the valid sample, 5.3% on the multiply imputed data, respectively), indicating that anti-social-behavioural expressions are in proportion of almost 95% (93.8% to 94.7%) attributable to individual differences rather than factors pertaining to educational milieus.

FIGURE A.5.8: Variations in Anti-Social Behaviour Scores Across Secondary Schools in Year 9: Level-2 Residual vs. Rank of Residual Plot, with Corresponding 95% Confidence Interval Error Bars (Valid Sample)



The highest predicted school average is located nearly 110, whereas the lowest is approximately 96; the typical average difference between these schools is thus of almost one standard deviation from the grand mean. If standard errors are factored in, the maximum school average across secondary schools could reach up to112.75 for the valid sample, while the minimum school average is situated around 92.25.

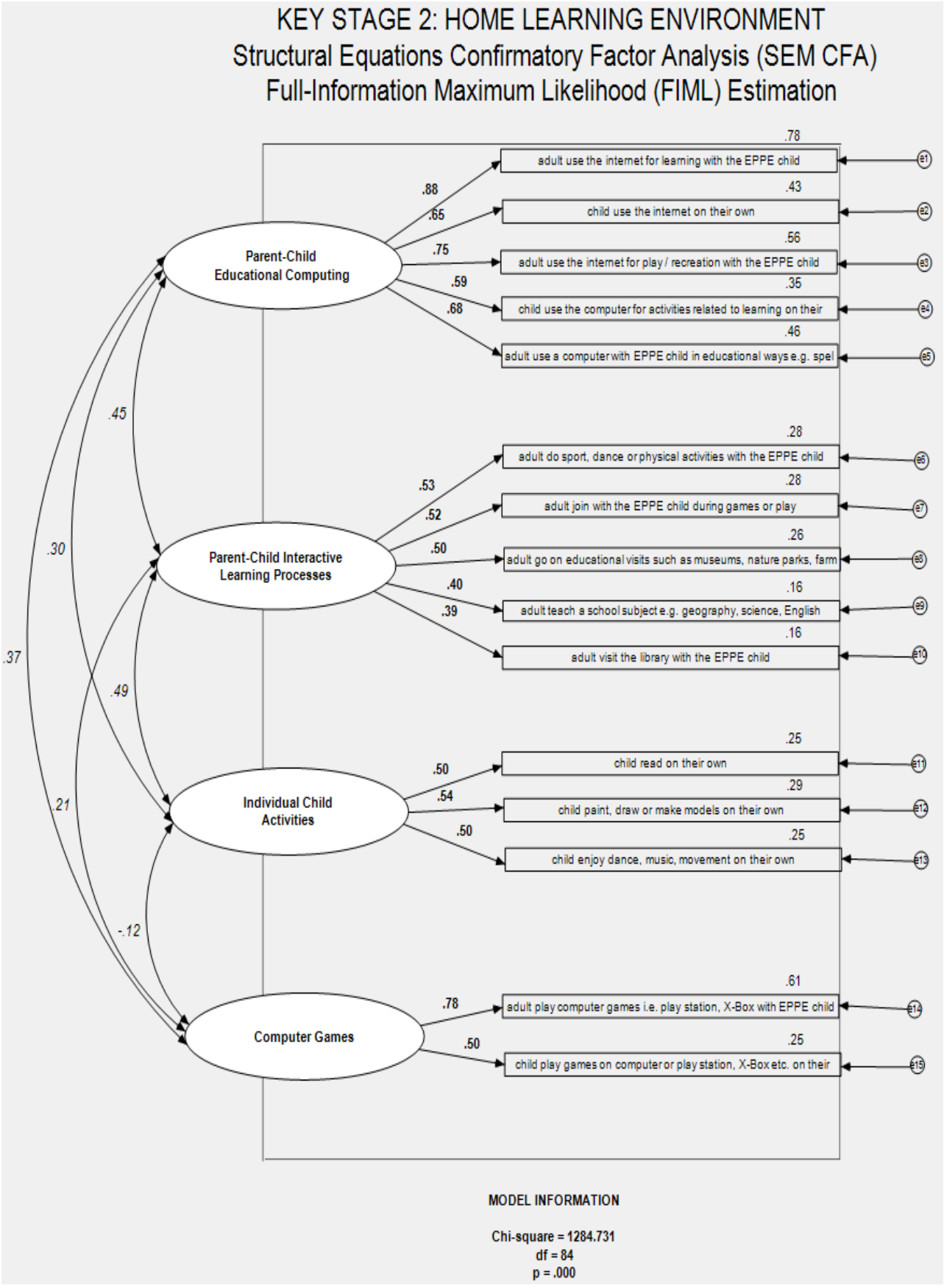
APPENDIX 6: Measuring the Quality of the Early Years and the Key Stage 2 Home Learning Environment

A.5.1. The Early Years Home Learning Environment (Early Years HLE)

Parental Interview Questionnaire Items Used: The EPPE Project - Students' activities at home

Does X [Student] have?
A regular bedtime
Rules about watching TV/videos
How often does X watch TV/videos in a typical weekday?
How many days in a typical week has X?
Played with friends at home
Does X have friends home to play?
Played with friends elsewhere
Does s/he go anywhere else to play?
Gone shopping with you
Gone on visits to friends or relatives
Sat down and eaten a meal with the whole family together
Does anyone at home ever read to X? If yes, how often?
Does anyone at home ever take X to the library? How often?
Does X ever play with letters or numbers? How often?
Does X ever paint and draw at home? How often?
Have you ever tried to teach X? ABC/ The Alphabet/ letters?
Numbers? How often?
Any songs/poems? How often?
Can you tell me which?
Any nursery rhymes? How often?
Can you tell me which?

A.6.2. The Key Stage 2 Home Learning Environment (KS2 HLE)



APPENDIX 7: Additional Sets of Estimates

A.7.1. Additional Estimates for Background Influences `self regulation`**SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 3**								
	ORIGINAL DATA				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
FIXED-EFFECTS PARAMETERS								
Gender	6.013	***	0.827	0.45	6.623	***	0.569	0.48
Age within cohort	0.202		0.131	0.10	0.242	***	0.084	0.11
Ethnicity: Ref = White UK heritage								
White European heritage	1.891		2.456	0.14	0.382		1.521	0.03
Black Caribbean heritage	-2.790		2.893	-0.21	0.043		1.545	0.00
Black African heritage	-3.813		3.663	-0.29	-2.638		1.973	-0.19
Any other ethnic minority	-0.661		3.412	-0.05	-0.467		1.843	-0.03
Indian heritage	3.167		3.411	0.24	2.915		1.966	0.21
Pakistani heritage	-4.596	*	2.453	-0.35	-2.085		1.333	-0.15
Bangladeshi heritage	3.782		4.859	0.28	1.721		2.731	0.13
Mixed race	-1.703		1.831	-0.13	-2.091	*	1.183	-0.15
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	6.001		3.993	0.45	-1.389		2.375	-0.10
Low birth weight, i.e. 1501-2500 g	-2.417		1.695	-0.18	-1.602		1.097	-0.12
Number of Siblings: Ref = No Siblings								
1 Sibling	0.792		1.274	0.06	0.893		0.913	0.07
2 Siblings	-0.219		1.408	-0.02	-0.201		1.011	-0.01
3+ Siblings	-1.736		1.624	-0.13	-2.218	*	1.187	-0.16
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.532	***	1.371	-0.27	-4.154	***	0.931	-0.30
2+ Behavioural Problems	-7.652	***	2.794	-0.57	-4.717	**	2.019	-0.34
Parent Interview I: Father's Highest Qualifications Level: Ref = None								
Absent Father	3.438	**	1.462	0.26	1.600	*	0.914	0.12
Other professional/ Misc.	7.619	*	4.135	0.57	4.306		2.960	0.31
Vocational	3.959	**	1.611	0.30	3.852	***	1.099	0.28
16 academic	4.218	***	1.368	0.32	3.629	***	0.921	0.27
18 academic	4.766	***	1.822	0.36	4.796	***	1.224	0.35
Degree or equivalent	9.284	***	1.551	0.70	9.112	***	1.045	0.67
Higher degree	10.838	***	1.895	0.81	11.119	***	1.429	0.81
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-3.593	***	1.259	-0.27	-2.951	***	0.866	-0.22
Separated/Divorced	0.438		1.825	0.03	-1.889		1.234	-0.14
Living with partner	-1.377		1.325	-0.10	-2.605	***	0.944	-0.19
Widow/ widower	-4.283		4.409	-0.32	-2.111		2.818	-0.15
Intercept	94.809	***	1.664		94.802	***	1.148	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.649	***	2.375		7.347	***	1.189	
Variance (Level 1)	177.301	***	4.130		187.474	***	2.668	
Total Variance	186.950				194.821			
Number of Level-1 Observations	1158				2930			
Number of Level-2 Units	376				775			
Deviance (-2 x Log Restricted-Likelihood)	9222.87				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.052				0.038			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	15.25				10.36			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	39.72				54.75			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	16.99				13.56			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 4	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	6.452	***	0.882	0.48	6.806	***	0.584	0.50
Age within cohort	0.133		0.140	0.06	0.236	***	0.084	0.11
Ethnicity: Ref = White UK heritage								
White European heritage	1.669		2.668	0.12	1.241		1.557	0.09
Black Caribbean heritage	-3.228		2.935	-0.24	0.037		1.534	0.00
Black African heritage	-2.346		3.942	-0.17	-1.645		1.961	-0.12
Any other ethnic minority	0.585		3.437	0.04	0.601		1.851	0.04
Indian heritage	3.077		3.677	0.23	3.149		1.985	0.23
Pakistani heritage	-4.603	*	2.753	-0.34	-1.306		1.345	-0.10
Bangladeshi heritage	3.982		6.231	0.29	3.050		2.784	0.22
Mixed race	-0.247		1.978	-0.02	-1.587		1.180	-0.12
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	7.173		4.431	0.53	-2.005		2.394	-0.15
Low birth weight, i.e. 1501-2500 g	-2.609		1.817	-0.19	-1.942	*	1.114	-0.14
Number of Siblings: Ref = No Siblings								
1 Sibling	1.345		1.360	0.10	1.200		0.909	0.09
2 Siblings	0.498		1.510	0.04	0.345		0.999	0.03
3+ Siblings	-1.258		1.756	-0.09	-1.401		1.179	-0.10
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.463		1.509	-0.18	-3.928	***	0.924	-0.29
2+ Behavioural Problems	-8.540	***	2.784	-0.63	-4.878	**	2.008	-0.36
Family Annual Earned Income: Ref = No Salary								
£ 2,500 - 15,000	1.331		1.448	0.10	1.490		1.053	0.11
£ 17,500 - 27,500	3.448	**	1.489	0.25	4.420	***	0.932	0.32
£ 30,000 - 35,000	3.699	**	1.661	0.27	4.958	***	1.168	0.36
£ 37,500 - 66,000	4.711	***	1.469	0.35	6.176	***	0.928	0.45
£ 67,000 - 132,000+	9.748	***	1.823	0.72	10.939	***	1.323	0.80
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-2.926	**	1.389	-0.22	-2.074	**	0.944	-0.15
Separated/Divorced	1.051		1.928	0.08	-1.315		1.236	-0.10
Living with partner	-1.272		1.422	-0.09	-2.364	**	0.952	-0.17
Widow/ widower	-2.581		4.747	-0.19	-1.411		2.855	-0.10
Intercept	95.580	***	1.830		94.136	***	1.173	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	8.013	***	2.304		8.015	***	1.201	
Variance (Level 1)	183.464	***	4.472		188.011	***	2.742	
Total Variance	191.477				196.026			
Number of Level-1 Observations	1038				2930			
Number of Level-2 Units	351				775			
Deviance (-2 x Log Restricted-Likelihood)	8289.17				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.042				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	12.31				10.10			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	49.94				50.64			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	14.98				13.02			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 5								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	5.163	***	0.780	0.37	6.311	***	0.575	0.46
Age within cohort	0.276	**	0.124	0.13	0.258	***	0.084	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	5.573	**	2.425	0.40	1.928		1.534	0.14
Black Caribbean heritage	-1.552		2.355	-0.11	-0.806		1.558	-0.06
Black African heritage	-5.071	*	2.962	-0.36	-2.086		1.956	-0.15
Any other ethnic minority	-0.440		2.722	-0.03	0.970		1.887	0.07
Indian heritage	8.764	***	2.937	0.63	5.232	***	1.920	0.38
Pakistani heritage	-1.821		2.265	-0.13	0.048		1.391	0.00
Bangladeshi heritage	9.821	**	4.584	0.71	5.095	*	2.700	0.37
Mixed race	-1.991		1.707	-0.14	-1.561		1.212	-0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.760	***	1.297	-0.27	-4.221	***	0.929	-0.31
2+ Behavioural Problems	-5.682	**	2.668	-0.41	-4.732	**	2.050	-0.34
Total Multiple Disadvantage Index: Ref = No Risk Factor								
1 Risk Factor	-2.444	**	1.052	-0.18	-2.289	***	0.795	-0.17
2 Risk Factors	-3.903	***	1.141	-0.28	-4.240	***	0.863	-0.31
3-4 Risk Factors	-8.903	***	1.200	-0.64	-8.684	***	0.911	-0.63
5+ Risk Factors	-9.027	***	1.924	-0.65	-10.326	***	1.240	-0.75
Intercept	102.138	***	0.924		101.532	***	0.713	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.772	***	2.064		8.197	***	1.262	
Variance (Level 1)	193.103	***	3.971		190.339	***	2.707	
Total Variance	202.875				198.536			
Number of Level-1 Observations	1399				2930			
Number of Level-2 Units	423				775			
Deviance (-2 x Log Restricted-Likelihood)	11331.47				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.048				0.041			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	7.70				8.99			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	38.94				49.51			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	9.92				11.91			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

SELF-REGULATION [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 6								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	6.132	***	0.823	0.46	6.704	***	0.565	0.49
Age within cohort	0.198		0.130	0.10	0.253	***	0.083	0.12
Ethnicity: Ref = White UK heritage								
White European heritage	1.119		2.486	0.08	-0.135		1.520	-0.01
Black Caribbean heritage	-1.667		2.931	-0.13	-0.362		1.529	-0.03
Black African heritage	-2.086		3.626	-0.16	-3.132		1.959	-0.23
Any other ethnic minority	0.450		3.360	0.03	-0.409		1.836	-0.03
Indian heritage	3.724		3.385	0.28	3.702	*	1.958	0.27
Pakistani heritage	-3.431		2.518	-0.26	-1.039		1.324	-0.08
Bangladeshi heritage	6.169		4.827	0.47	3.291		2.734	0.24
Mixed race	-1.370		1.827	-0.10	-2.136	*	1.174	-0.16
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	5.544		3.962	0.42	-1.863		2.361	-0.14
Low birth weight, i.e. 1501-2500 g	-2.209		1.716	-0.17	-1.150		1.102	-0.08
Number of Siblings: Ref = No Siblings								
1 Sibling	1.409		1.267	0.11	1.305		0.898	0.10
2 Siblings	0.010		1.397	0.00	0.169		0.973	0.01
3+ Siblings	-0.931		1.622	-0.07	-1.440		1.171	-0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.939	**	1.365	-0.22	-4.047	***	0.919	-0.30
2+ Behavioural Problems	-7.650	***	2.717	-0.58	-4.499	**	1.998	-0.33
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	3.996		3.194	0.30	5.688	**	2.274	0.42
Vocational	0.322		1.523	0.02	3.192	***	0.935	0.23
16 academic	2.764	**	1.304	0.21	3.916	***	0.790	0.29
18 academic	7.027	***	1.750	0.53	7.472	***	1.205	0.55
Degree or equivalent	9.181	***	1.544	0.70	10.642	***	1.028	0.78
Higher degree	11.598	***	2.107	0.88	12.373	***	1.534	0.91
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-3.963	***	1.216	-0.30	-3.233	***	0.852	-0.24
Separated/Divorced	0.185		1.799	0.01	-1.985		1.230	-0.15
Living with partner	-2.047		1.308	-0.15	-2.858	***	0.920	-0.21
Widow/ widower	-2.620		4.385	-0.20	-1.592		2.800	-0.12
RANDOM-EFFECTS PARAMETERS								
Intercept	95.052	***	1.718		93.546	***	1.091	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	9.540	***	2.318		6.876	***	1.153	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	174.393	***	4.071		185.244	***	2.667	
Total Variance	183.933				192.120			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9119.61				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.052				0.036			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.64				11.43			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	40.39				57.65			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	18.33				14.76			
* p<0.10, ** p<0.05, *** p<0.01								

A.71.2. Pro-Social Behaviour

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 4	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	7.735	***	0.883	0.58	8.794	***	0.583	0.64
Age within cohort	0.061		0.140	0.03	0.156	*	0.087	0.07
Ethnicity: Ref = White UK heritage								
White European heritage	-0.009		2.661	-0.00	0.636		1.495	0.05
Black Caribbean heritage	-5.648	*	2.938	-0.42	-1.327		1.579	-0.10
Black African heritage	-2.000		3.945	-0.15	-1.627		1.985	-0.12
Any other ethnic minority	-0.991		3.433	-0.07	-0.500		1.737	-0.04
Indian heritage	0.286		3.683	0.02	1.212		1.926	0.09
Pakistani heritage	-5.150	*	2.759	-0.38	-1.779		1.379	-0.13
Bangladeshi heritage	1.326		6.221	0.10	2.512		2.655	0.18
Mixed race	-1.728		1.976	-0.13	-1.682		1.205	-0.12
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	8.335	*	4.415	0.62	-0.302		2.510	-0.02
Low birth weight, i.e. 1501-2500 g	-0.625		1.810	-0.05	-0.821		1.085	-0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	1.224		1.357	0.09	1.181		0.893	0.09
2 Siblings	0.314		1.507	0.02	0.216		0.969	0.02
3+ Siblings	-0.809		1.752	-0.06	-1.075		1.126	-0.08
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.011	**	1.503	-0.22	-3.696	***	0.907	-0.27
2+ Behavioural Problems	-4.748	*	2.776	-0.35	-3.056		1.929	-0.22
Family Annual Earned Income: Ref = No Salary								
£ 2,500 - 15,000	1.414		1.443	0.11	0.886		1.002	0.06
£ 17,500 - 27,500	2.692	*	1.486	0.20	3.599	***	0.956	0.26
£ 30,000 - 35,000	2.801	*	1.657	0.21	4.152	***	1.229	0.30
£ 37,500 - 66,000	3.076	**	1.467	0.23	4.195	***	1.017	0.31
£ 67,000 - 132,000+	7.404	***	1.826	0.55	7.947	***	1.380	0.58
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-1.865		1.386	-0.14	-1.556	*	0.927	-0.11
Separated/Divorced	-0.593		1.922	-0.04	-1.631		1.217	-0.12
Living with partner	-1.652		1.417	-0.12	-1.676	*	0.905	-0.12
Widow/ widower	-0.966		4.737	-0.07	-0.550		2.704	-0.04
Intercept	95.730	***	1.831		93.931	***	1.187	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.448	***	2.681		8.877	***	1.280	
Variance (Level 1)	180.040	***	4.469		187.043	***	2.713	
Total Variance	191.488				195.920			
Number of Level-1 Observations	1038				2930			
Number of Level-2 Units	351				775			
Deviance (-2 x Log Restricted-Likelihood)	8285.00				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.060				0.045			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	13.46				10.95			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	35.03				42.90			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	15.14				13.16			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 5								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	6.725	***	0.782	0.49	8.422	***	0.583	0.62
Age within cohort	0.177		0.124	0.08	0.176	**	0.088	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	3.960		2.422	0.29	1.156		1.485	0.08
Black Caribbean heritage	-2.131		2.361	-0.15	-1.889		1.568	-0.14
Black African heritage	-2.488		2.965	-0.18	-1.921		1.968	-0.14
Any other ethnic minority	-1.673		2.729	-0.12	-0.199		1.736	-0.01
Indian heritage	5.540	*	2.948	0.40	2.925		1.914	0.21
Pakistani heritage	-1.336		2.287	-0.10	-0.607		1.398	-0.04
Bangladeshi heritage	9.712	**	4.589	0.70	4.213		2.788	0.31
Mixed race	-2.378		1.707	-0.17	-1.692		1.225	-0.12
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.725	***	1.294	-0.27	-3.886	***	0.903	-0.28
2+ Behavioural Problems	-4.432	*	2.663	-0.32	-2.876		1.942	-0.21
Total Multiple Disadvantage Index: Ref = No Risk Factor								
1 Risk Factor	-2.538	**	1.050	-0.18	-2.168	***	0.817	-0.16
2 Risk Factors	-2.993	***	1.141	-0.22	-3.058	***	0.859	-0.22
3-4 Risk Factors	-7.203	***	1.202	-0.52	-6.941	***	0.945	-0.51
5+ Risk Factors	-6.635	***	1.925	-0.48	-8.283	***	1.276	-0.60
Intercept	100.790	***	0.933		99.785	***	0.720	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.411	***	2.407		9.009	***	1.299	
Variance (Level 1)	190.256	***	3.969		187.521	***	2.721	
Total Variance	203.666				196.530			
Number of Level-1 Observations	1399				2930			
Number of Level-2 Units	423				775			
Deviance (-2 x Log Restricted-Likelihood)	11329.58				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.066				0.046			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	8.55				10.73			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	23.89				42.05			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	9.75				12.88			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 6								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	7.411	***	0.831	0.56	8.718	***	0.578	0.64
Age within cohort	0.098		0.132	0.05	0.166	*	0.087	0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-0.176		2.503	-0.01	-0.318		1.483	-0.02
Black Caribbean heritage	-4.010		2.963	-0.30	-1.472		1.545	-0.11
Black African heritage	-0.082		3.668	-0.01	-2.534		1.968	-0.19
Any other ethnic minority	-0.649		3.389	-0.05	-1.149		1.724	-0.08
Indian heritage	1.447		3.421	0.11	1.671		1.928	0.12
Pakistani heritage	-3.786		2.551	-0.29	-1.591		1.364	-0.12
Bangladeshi heritage	4.734		4.860	0.36	2.731		2.686	0.20
Mixed race	-1.779		1.842	-0.13	-1.998	*	1.208	-0.15
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	7.964	**	3.987	0.60	-0.205		2.503	-0.02
Low birth weight, i.e. 1501-2500 g	0.076		1.726	0.01	-0.219		1.081	-0.02
Number of Siblings: Ref = No Siblings								
1 Sibling	1.180		1.276	0.09	1.211		0.892	0.09
2 Siblings	0.009		1.407	0.00	0.026		0.964	0.00
3+ Siblings	-0.814		1.634	-0.06	-1.156		1.097	-0.08
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.029	**	1.373	-0.23	-3.803	***	0.900	-0.28
2+ Behavioural Problems	-4.221		2.736	-0.32	-2.754		1.930	-0.20
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	1.753		3.216	0.13	2.872		2.306	0.21
Vocational	-0.889		1.535	-0.07	1.546	*	0.924	0.11
16 academic	2.448	*	1.314	0.19	3.274	***	0.775	0.24
18 academic	4.837	***	1.765	0.37	5.441	***	1.127	0.40
Degree or equivalent	7.239	***	1.561	0.55	8.041	***	0.996	0.59
Higher degree	8.697	***	2.130	0.66	8.389	***	1.564	0.62
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-2.660	**	1.226	-0.20	-2.473	***	0.852	-0.18
Separated/Divorced	-1.204		1.810	-0.09	-2.148	*	1.218	-0.16
Living with partner	-1.551		1.316	-0.12	-2.089	**	0.878	-0.15
Widow/ widower	0.615		4.421	0.05	-0.730		2.685	-0.05
RANDOM-EFFECTS PARAMETERS								
Intercept	95.183	***	1.736		93.536	***	1.114	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.446	***	2.745		8.317	***	1.243	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	174.397	***	4.147		185.437	***	2.677	
Total Variance	187.843				193.754			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9136.89				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.072				0.043			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.17				11.72			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	23.69				46.50			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	16.76				14.12			
* p<0.10, ** p<0.05, *** p<0.01								

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 7								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	7.271	***	0.827	0.55	8.687	***	0.578	0.64
Age within cohort	0.103		0.131	0.05	0.161	*	0.088	0.07
Ethnicity: Ref = White UK heritage								
White European heritage	0.575		2.450	0.04	0.012		1.494	0.00
Black Caribbean heritage	-5.153	*	2.897	-0.39	-1.075		1.559	-0.08
Black African heritage	-2.016		3.671	-0.15	-2.242		1.977	-0.16
Any other ethnic minority	-1.914		3.409	-0.14	-1.193		1.735	-0.09
Indian heritage	0.825		3.414	0.06	1.016		1.930	0.07
Pakistani heritage	-4.429	*	2.464	-0.34	-2.262	*	1.350	-0.17
Bangladeshi heritage	3.255		4.848	0.25	1.496		2.681	0.11
Mixed race	-2.311		1.829	-0.17	-1.968		1.203	-0.14
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	8.350	**	3.982	0.63	0.249		2.495	0.02
Low birth weight, i.e. 1501-2500 g	-0.285		1.689	-0.02	-0.476		1.076	-0.03
Number of Siblings: Ref = No Siblings								
1 Sibling	0.829		1.271	0.06	0.836		0.918	0.06
2 Siblings	-0.054		1.405	-0.00	-0.304		0.984	-0.02
3+ Siblings	-1.085		1.621	-0.08	-1.748		1.109	-0.13
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-3.481	**	1.367	-0.26	-3.804	***	0.905	-0.28
2+ Behavioural Problems	-4.026		2.786	-0.30	-2.899		1.926	-0.21
Parent Interview I: Father's Highest Qualifications Level: Ref = None								
Absent Father	3.693	**	1.458	0.28	0.684		0.876	0.05
Other professional/ Misc.	8.703	**	4.126	0.66	3.167		2.919	0.23
Vocational	3.873	**	1.608	0.29	2.517	**	1.054	0.18
16 academic	4.415	***	1.365	0.33	3.221	***	0.933	0.24
18 academic	4.358	**	1.819	0.33	3.457	***	1.203	0.25
Degree or equivalent	8.945	***	1.551	0.68	7.347	***	1.059	0.54
Higher degree	8.687	***	1.895	0.66	7.839	***	1.418	0.57
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	-2.311	*	1.257	-0.18	-2.043	**	0.860	-0.15
Separated/Divorced	-0.964		1.818	-0.07	-1.910		1.227	-0.14
Living with partner	-1.002		1.321	-0.08	-1.748	*	0.898	-0.13
Widow/ widower	-0.643		4.403	-0.05	-0.993		2.694	-0.07
RANDOM-EFFECTS PARAMETERS								
Intercept	93.842	***	1.665		94.385	***	1.127	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.931	***	2.722		8.484	***	1.276	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	174.357	***	4.131		186.067	***	2.690	
Total Variance	187.287				194.550			
Number of Level-1 Observations	1158				2930			
Number of Level-2 Units	376				775			
Deviance (-2 x Log Restricted-Likelihood)	9219.38				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.069				0.044			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.19				11.42			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	26.62				45.42			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.00				13.76			
* p<0.10, ** p<0.05, *** p<0.01								

PRO-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]:Early Years HLE (Continuous) Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	6.592	***	0.851	0.50	8.250	***	0.583	0.61
Age within cohort	0.069		0.132	0.03	0.167	*	0.087	0.08
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	7.713	*	3.965	0.59	-0.119		2.496	-0.01
Low birth weight, i.e. 1501-2500 g	0.622		1.726	0.05	0.068		1.060	0.00
Number of Siblings: Ref = No Siblings								
1 Sibling	1.632		1.283	0.12	1.559	*	0.889	0.12
2 Siblings	1.002		1.426	0.08	0.659		0.973	0.05
3+ Siblings	0.413		1.673	0.03	-0.143		1.139	-0.01
Ethnicity: Ref = White UK heritage								
White European heritage	0.470		2.535	0.04	0.107		1.483	0.01
Black Caribbean heritage	-3.873		2.962	-0.30	-1.233		1.563	-0.09
Black African heritage	0.455		3.652	0.03	-1.659		1.982	-0.12
Any other ethnic minority	0.862		3.392	0.07	-0.287		1.713	-0.02
Indian heritage	1.857		3.616	0.14	2.229		1.911	0.16
Pakistani heritage	-1.222		2.635	-0.09	-0.348		1.367	-0.03
Bangladeshi heritage	4.985		4.851	0.38	3.936		2.700	0.29
Mixed race	-1.338		1.835	-0.10	-1.478		1.214	-0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	-2.833	**	1.373	-0.22	-3.792	***	0.896	-0.28
2+ Behavioural Problems	-4.058		2.775	-0.31	-2.838		1.915	-0.21
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	-2.095		3.183	-0.16	-0.994		2.207	-0.07
Semi-Skilled	-2.980		1.941	-0.23	-1.268		1.145	-0.09
Skilled Manual	-0.847		1.767	-0.06	1.009		1.048	0.07
Skilled, Non-Manual	2.769	*	1.673	0.21	2.772	***	0.988	0.20
Other Professional, Non-Manual	1.549		1.545	0.12	3.069	***	0.996	0.23
Professional, Non-Manual	2.958		1.955	0.23	4.232	***	1.345	0.31
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	-0.537		3.262	-0.04	0.572		2.310	0.04
Vocational	-2.411		1.588	-0.18	0.048		0.949	0.00
16 academic	1.223		1.367	0.09	2.004	**	0.779	0.15
18 academic	2.359		1.872	0.18	2.901	**	1.159	0.21
Degree or equivalent	4.136	**	1.769	0.32	4.772	***	1.104	0.35
Higher degree	5.168	**	2.359	0.39	4.619	***	1.688	0.34
Marital Status of Parent Ref = Married								
Single	-1.918		1.339	-0.15	-1.340		0.935	-0.10
Separated/Divorced	-0.868		1.876	-0.07	-1.391		1.243	-0.10
Living with partner	-1.511		1.322	-0.12	-1.784	**	0.870	-0.13
Widow/ widower	1.643		4.447	0.13	0.234		2.695	0.02
Early Years HLE (Continuous scale)	0.187	***	0.061	0.22	0.169	***	0.041	0.19
Intercept	90.750	***	2.452		88.513	***	1.635	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	13.772	***	2.759		7.408	***	1.183	
Variance (Level 1)	171.282	***	4.130		183.140	***	2.631	
Total Variance	185.054				190.547			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8930.03				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.074				0.039			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.67				12.81			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	21.84				52.35			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	17.99				15.54			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

A.7.1.3. Hyperactivity

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 4								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA (Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-7.026	***	0.863	-0.53	-7.848	***	0.533	-0.57
Age within cohort	-0.061		0.137	-0.03	-0.149	*	0.085	-0.07
Ethnicity: Ref = White UK heritage								
White European heritage	-1.419		2.612	-0.11	-1.127		1.527	-0.08
Black Caribbean heritage	3.725		2.871	0.28	0.254		1.518	0.02
Black African heritage	2.229		3.857	0.17	1.719		1.958	0.13
Any other ethnic minority	0.777		3.364	0.06	-0.258		1.808	-0.02
Indian heritage	-6.137	*	3.598	-0.46	-3.276		2.004	-0.24
Pakistani heritage	3.246		2.693	0.24	0.148		1.344	0.01
Bangladeshi heritage	-8.672		6.099	-0.65	-5.074	*	2.779	-0.37
Mixed race	0.324		1.936	0.02	1.609		1.197	0.12
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-6.670		4.338	-0.50	1.879		2.273	0.14
Low birth weight, i.e. 1501-2500 g	2.031		1.779	0.15	1.800		1.124	0.13
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.619		1.331	-0.05	-1.629	*	0.906	-0.12
2 Siblings	-0.381		1.479	-0.03	-1.028		0.957	-0.08
3+ Siblings	1.844		1.719	0.14	1.150		1.111	0.08
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.034	**	1.477	0.23	4.787	***	0.903	0.35
2+ Behavioural Problems	9.206	***	2.725	0.69	6.154	***	1.976	0.45
Family Annual Earned Income: Ref = No Salary								
£ 2,500 - 15,000	-1.101		1.418	-0.08	-1.205		0.940	-0.09
£ 17,500 - 27,500	-2.777	*	1.458	-0.21	-4.387	***	0.957	-0.32
£ 30,000 - 35,000	-3.191	**	1.626	-0.24	-4.898	***	1.118	-0.36
£ 37,500 - 66,000	-2.757	*	1.438	-0.21	-5.043	***	0.918	-0.37
£ 67,000 - 132,000+	-6.442	***	1.784	-0.49	-8.650	***	1.299	-0.63
Marital Status of Parent Ref = Married								
Single	4.056	***	1.360	0.31	2.836	***	0.954	0.21
Separated/Divorced	0.903		1.888	0.07	2.903	**	1.243	0.21
Living with partner	1.628		1.392	0.12	2.647	**	1.059	0.19
Widow/ widower	4.743		4.648	0.36	0.437		2.827	0.03
Intercept	102.853	***	1.791		106.026	***	1.134	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.089	***	2.237		6.922	***	1.160	
Variance (Level 1)	176.296	***	4.315		186.344	***	2.646	
Total Variance	183.385				193.266			
Number of Level-1 Observations	1038				2930			
Number of Level-2 Units	351				775			
Deviance (-2 x Log Restricted-Likelihood)	8246.16				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.039				0.036			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	15.56				11.89			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	56.79				50.18			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	18.56				14.25			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 5								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.298	***	0.777	-0.46	-7.406	***	0.534	-0.54
Age within cohort	-0.130		0.123	-0.06	-0.173	**	0.085	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-5.980	**	2.407	-0.44	-1.759		1.511	-0.13
Black Caribbean heritage	0.874		2.344	0.06	1.120		1.536	0.08
Black African heritage	5.156	*	2.946	0.38	2.064		1.968	0.15
Any other ethnic minority	0.090		2.710	0.01	-0.605		1.768	-0.04
Indian heritage	-7.678	***	2.926	-0.56	-5.420	***	1.973	-0.39
Pakistani heritage	0.083		2.266	0.01	-1.429		1.336	-0.10
Bangladeshi heritage	-12.703	***	4.559	-0.92	-7.382	***	2.701	-0.54
Mixed race	2.120		1.696	0.15	1.636		1.193	0.12
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	4.392	***	1.287	0.32	5.055	***	0.901	0.37
2+ Behavioural Problems	8.011	***	2.648	0.58	5.991	***	1.983	0.44
Total Multiple Disadvantage Index: Ref = No Risk Factor								
1 Risk Factor	2.086	**	1.044	0.15	1.688	**	0.792	0.12
2 Risk Factors	3.361	***	1.134	0.24	3.486	***	0.828	0.25
3-4 Risk Factors	8.073	***	1.194	0.59	8.019	***	0.872	0.58
5+ Risk Factors	8.664	***	1.913	0.63	9.829	***	1.253	0.72
Intercept	98.732	***	0.925		99.468	***	0.679	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	12.104	***	2.099		6.776	***	1.181	
Variance (Level 1)	188.755	***	3.874		188.620	***	2.644	
Total Variance	200.859				195.396			
Number of Level-1 Observations	1399				2930			
Number of Level-2 Units	423				775			
Deviance (-2 x Log Restricted-Likelihood)	11312.84				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.060				0.035			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	9.59				10.82			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	26.23				51.23			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	10.80				13.31			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 6								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	-7.112	***	0.814	-0.54	-7.765	***	0.525	-0.57
Age within cohort	-0.072		0.129	-0.03	-0.163	*	0.084	-0.08
Ethnicity: Ref = White UK heritage								
White European heritage	-1.556		2.465	-0.12	0.060		1.522	0.00
Black Caribbean heritage	1.951		2.898	0.15	0.541		1.494	0.04
Black African heritage	3.057		3.584	0.23	2.922		1.967	0.21
Any other ethnic minority	0.434		3.327	0.03	0.619		1.804	0.05
Indian heritage	-4.931		3.348	-0.38	-3.747	*	2.012	-0.28
Pakistani heritage	2.536		2.487	0.19	-0.019		1.306	-0.00
Bangladeshi heritage	-8.932	*	4.785	-0.68	-5.221	*	2.727	-0.38
Mixed race	1.050		1.810	0.08	2.112	*	1.202	0.16
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-6.004		3.928	-0.46	1.694		2.283	0.12
Low birth weight, i.e. 1501-2500 g	1.578		1.702	0.12	1.110		1.125	0.08
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.785		1.255	-0.06	-1.670	*	0.889	-0.12
2 Siblings	-0.307		1.385	-0.02	-0.836		0.937	-0.06
3+ Siblings	2.089		1.607	0.16	1.234		1.078	0.09
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.536	***	1.353	0.27	4.884	***	0.901	0.36
2+ Behavioural Problems	8.692	***	2.693	0.66	5.910	***	1.976	0.43
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	-0.206		3.166	-0.02	-4.475	**	2.247	-0.33
Vocational	0.237		1.508	0.02	-2.665	***	0.927	-0.20
16 academic	-1.771		1.292	-0.13	-3.326	***	0.768	-0.24
18 academic	-4.093	**	1.732	-0.31	-6.184	***	1.118	-0.45
Degree or equivalent	-6.327	***	1.526	-0.48	-8.897	***	1.007	-0.65
Higher degree	-7.904	***	2.082	-0.60	-9.696	***	1.504	-0.71
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	5.078	***	1.204	0.39	3.937	***	0.864	0.29
Separated/Divorced	2.117		1.785	0.16	3.500	***	1.232	0.26
Living with partner	2.385	*	1.297	0.18	3.084	***	1.056	0.23
Widow/ widower	5.160		4.343	0.39	0.682		2.804	0.05
RANDOM-EFFECTS PARAMETERS								
Intercept	103.038	***	1.699		106.292	***	1.052	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.221	***	2.082		5.992	***	1.113	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	172.797	***	4.001		184.876	***	2.610	
Total Variance	180.018				190.868			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9098.64				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.040				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.24				12.59			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	55.99				56.87			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.06				15.32			
* p<0.10, ** p<0.05, *** p<0.01								

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 7								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	-7.171	***	0.810	-0.55	-7.736	***	0.527	-0.57
Age within cohort	-0.096		0.128	-0.05	-0.156	*	0.085	-0.07
Ethnicity: Ref = White UK heritage								
White European heritage	-1.668		2.413	-0.13	-0.339		1.504	-0.02
Black Caribbean heritage	2.989		2.835	0.23	-0.109		1.499	-0.01
Black African heritage	4.195		3.587	0.32	2.312		1.969	0.17
Any other ethnic minority	1.552		3.348	0.12	0.615		1.790	0.05
Indian heritage	-4.599		3.343	-0.35	-3.082		2.014	-0.23
Pakistani heritage	2.795		2.398	0.21	0.738		1.312	0.05
Bangladeshi heritage	-7.458		4.774	-0.57	-3.922		2.741	-0.29
Mixed race	1.174		1.797	0.09	1.988	*	1.202	0.15
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-6.466	*	3.924	-0.49	1.265		2.297	0.09
Low birth weight, i.e. 1501-2500 g	1.591		1.666	0.12	1.404		1.113	0.10
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.078		1.251	-0.01	-1.223		0.905	-0.09
2 Siblings	-0.002		1.383	-0.00	-0.441		0.953	-0.03
3+ Siblings	2.553		1.595	0.19	1.934	*	1.095	0.14
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.792	***	1.347	0.29	4.868	***	0.903	0.36
2+ Behavioural Problems	8.230	***	2.745	0.63	5.913	***	1.975	0.43
Parent Interview I: Father's Highest Qualifications Level: Ref = None								
Absent Father	-1.506		1.436	-0.11	-0.667		0.885	-0.05
Other professional/ Misc.	-9.024	**	4.061	-0.69	-5.164	*	2.701	-0.38
Vocational	-3.661	**	1.582	-0.28	-3.162	***	1.041	-0.23
16 academic	-3.753	***	1.343	-0.29	-3.622	***	0.891	-0.27
18 academic	-3.879	**	1.790	-0.30	-3.946	***	1.237	-0.29
Degree or equivalent	-7.395	***	1.522	-0.56	-7.910	***	1.036	-0.58
Higher degree	-8.662	***	1.858	-0.66	-9.445	***	1.429	-0.69
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	4.068	***	1.237	0.31	3.426	***	0.890	0.25
Separated/Divorced	1.527		1.794	0.12	3.224	***	1.235	0.24
Living with partner	1.367		1.302	0.10	2.701	**	1.073	0.20
Widow/ widower	5.752		4.327	0.44	0.958		2.813	0.07
RANDOM-EFFECTS PARAMETERS								
Intercept	104.088	***	1.630		105.352	***	1.065	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.065	***	2.072		6.026	***	1.129	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	172.659	***	3.982		185.347	***	2.623	
Total Variance	179.724				191.373			
Number of Level-1 Observations	1158				2930			
Number of Level-2 Units	376				775			
Deviance (-2 x Log Restricted-Likelihood)	9181.62				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.039				0.031			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	17.30				12.36			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	56.94				56.62			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.19				15.09			
* p<0.10, ** p<0.05, *** p<0.01								

HYPERACTIVITY [SEM CFA Derived Latent Construct, IQ Standardized]: Early Years HLE (Continuous) Model								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-6.528	***	0.835	-0.50	-7.220	***	0.531	-0.54
Age within cohort	-0.065		0.130	-0.03	-0.165	**	0.084	-0.08
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-5.856		3.914	-0.45	1.596		2.264	0.12
Low birth weight, i.e. 1501-2500 g	1.291		1.706	0.10	0.797		1.118	0.06
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.302		1.265	-0.10	-2.076	**	0.896	-0.15
2 Siblings	-1.284		1.407	-0.10	-1.588	*	0.951	-0.12
3+ Siblings	1.004		1.650	0.08	0.083		1.106	0.01
Ethnicity: Ref = White UK heritage								
White European heritage	-1.711		2.501	-0.13	-0.358		1.513	-0.03
Black Caribbean heritage	1.629		2.904	0.12	0.246		1.506	0.02
Black African heritage	2.743		3.578	0.21	1.959		1.960	0.15
Any other ethnic minority	-1.059		3.338	-0.08	-0.346		1.778	-0.03
Indian heritage	-5.461		3.553	-0.42	-4.428	**	1.976	-0.33
Pakistani heritage	0.908		2.577	0.07	-1.441		1.323	-0.11
Bangladeshi heritage	-8.919	*	4.784	-0.68	-6.538	**	2.700	-0.49
Mixed race	0.634		1.807	0.05	1.493		1.180	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.513	***	1.355	0.27	4.854	***	0.892	0.36
2+ Behavioural Problems	8.348	***	2.737	0.64	5.958	***	1.945	0.44
Parents' Highest SES at KS2: Ref = Unemployed/Not working								
Unskilled	1.465		3.147	0.11	1.873		2.174	0.14
Semi-Skilled	4.383	**	1.914	0.34	2.352	**	1.106	0.17
Skilled Manual	2.121		1.741	0.16	-0.454		1.049	-0.03
Skilled, Non-Manual	-1.711		1.650	-0.13	-2.692	***	0.998	-0.20
Other Professional, Non-Manual	-0.514		1.522	-0.04	-3.226	***	0.949	-0.24
Professional, Non-Manual	-0.863		1.927	-0.07	-3.800	***	1.274	-0.28
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	1.984		3.219	0.15	-1.839		2.240	-0.14
Vocational	1.573		1.564	0.12	-0.966		0.940	-0.07
16 academic	-0.603		1.347	-0.05	-1.894	**	0.789	-0.14
18 academic	-1.905		1.843	-0.15	-3.275	***	1.165	-0.24
Degree or equivalent	-3.852	**	1.739	-0.30	-5.220	***	1.150	-0.39
Higher degree	-5.048	**	2.317	-0.39	-5.594	***	1.632	-0.42
Marital Status of Parent Ref = Married								
Single	4.857	***	1.320	0.37	2.793	***	0.914	0.21
Separated/Divorced	1.678		1.855	0.13	2.760	**	1.231	0.21
Living with partner	2.256	*	1.305	0.17	2.788	***	1.036	0.21
Widow/ widower	4.403		4.378	0.34	-0.259		2.784	-0.02
Early Years HLE (Continuous scale)	-0.189	***	0.060	-0.22	-0.194	***	0.042	-0.22
Intercept	106.661	***	2.414		111.584	***	1.559	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	7.976	***	2.123		5.298	***	1.059	
Variance (Level 1)	170.151	***	3.994		181.235	***	2.544	
Total Variance	178.127				186.533			
Number of Level-1 Observations	1126				2930			
Number of Level-2 Units	371				775			
Deviance (-2 x Log Restricted-Likelihood)	8897.24				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.045				0.028			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.50				14.31			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	51.39				61.86			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	20.90				17.24			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

A.7.1.4. Anti-Social Behaviour

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 4								
FIXED-EFFECTS PARAMETERS	**ORIGINAL DATA**				**IMPUTED DATA(Stata ICE)**			
	Estimate	**Sig.**	**Std. Error**	**Effect Size**	**Estimate**	**Sig.**	**Std. Error**	**Effect Size**
Gender	-4.937	***	0.858	-0.37	-6.185	***	0.617	-0.44
Age within cohort	0.016		0.136	0.01	-0.047		0.088	-0.02
Ethnicity: Ref = White UK heritage								
White European heritage	-1.804		2.604	-0.14	-0.990		1.569	-0.07
Black Caribbean heritage	3.356		2.855	0.25	0.689		1.612	0.05
Black African heritage	2.145		3.835	0.16	1.960		2.265	0.14
Any other ethnic minority	2.942		3.350	0.22	0.884		2.088	0.06
Indian heritage	-5.681		3.576	-0.43	-1.335		2.065	-0.10
Pakistani heritage	1.138		2.674	0.09	-0.403		1.438	-0.03
Bangladeshi heritage	-6.708		6.075	-0.50	-3.751		2.927	-0.27
Mixed race	1.116		1.928	0.08	1.703		1.432	0.12
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-4.171		4.328	-0.31	2.021		2.430	0.14
Low birth weight, i.e. 1501-2500 g	2.978	*	1.775	0.22	2.221	*	1.211	0.16
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.414		1.326	-0.11	-1.401		0.961	-0.10
2 Siblings	-0.809		1.473	-0.06	-0.710		1.054	-0.05
3+ Siblings	1.531		1.713	0.12	1.301		1.303	0.09
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.901	**	1.473	0.22	4.347	***	0.980	0.31
2+ Behavioural Problems	5.481	**	2.717	0.41	4.675	**	2.061	0.33
Family Annual Earned Income: Ref = No Salary								
£ 2,500 - 15,000	-1.264		1.414	-0.09	-1.185		0.956	-0.08
£ 17,500 - 27,500	-1.214		1.453	-0.09	-3.172	***	1.015	-0.23
£ 30,000 - 35,000	-3.330	**	1.619	-0.25	-4.680	***	1.216	-0.33
£ 37,500 - 66,000	-2.838	**	1.431	-0.21	-4.349	***	0.999	-0.31
£ 67,000 - 132,000+	-5.591	***	1.772	-0.42	-7.412	***	1.267	-0.53
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	3.068	**	1.354	0.23	2.188	**	1.049	0.16
Separated/Divorced	1.654		1.883	0.12	2.535	**	1.287	0.18
Living with partner	0.853		1.389	0.06	1.793		1.119	0.13
Widow/ widower	3.433		4.631	0.26	-1.107		2.932	-0.08
Intercept	102.447	***	1.780		104.809	***	1.211	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.710	*	2.207		7.221	***	1.366	
Variance (Level 1)	176.995	***	4.364		196.710	***	2.923	
Total Variance	181.706				203.931			
Number of Level-1 Observations	1038				2930			
Number of Level-2 Units	351				775			
Deviance (-2 x Log Restricted-Likelihood)	8239.06				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.026				0.035			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	16.35				7.83			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	65.72				39.54			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	19.36				9.51			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 5								
	ORIGINAL DATA				IMPUTED DATA (Stata ICE)			
	Estimate	Sig.	Std. Error	Effect Size	Estimate	Sig.	Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	-4.727	***	0.785	-0.34	-5.803	***	0.634	-0.41
Age within cohort	0.037		0.125	0.02	-0.066		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-5.119	**	2.436	-0.37	-1.519		1.566	-0.11
Black Caribbean heritage	1.206		2.370	0.09	1.414		1.617	0.10
Black African heritage	4.385		2.979	0.32	2.273		2.272	0.16
Any other ethnic minority	2.216		2.740	0.16	0.574		1.993	0.04
Indian heritage	-5.065	*	2.958	-0.36	-3.010		2.026	-0.21
Pakistani heritage	-1.485		2.288	-0.11	-1.619		1.435	-0.11
Bangladeshi heritage	-10.580	**	4.610	-0.76	-5.470	*	2.866	-0.39
Mixed race	2.771		1.716	0.20	1.676		1.390	0.12
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.605	***	1.302	0.26	4.585	***	0.990	0.33
2+ Behavioural Problems	6.725	**	2.679	0.48	4.549	**	2.077	0.32
Total Multiple Disadvantage Index: Ref = No Risk Factor								
1 Risk Factor	1.921	*	1.056	0.14	1.634	*	0.862	0.12
2 Risk Factors	3.191	***	1.147	0.23	2.983	***	0.900	0.21
3-4 Risk Factors	7.370	***	1.207	0.53	6.922	***	0.971	0.49
5+ Risk Factors	7.618	***	1.935	0.55	8.715	***	1.327	0.62
Intercept	98.312	***	0.934		99.136	***	0.741	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	11.657	***	2.175		6.936	***	1.355	
Variance (Level 1)	193.672	***	3.989		198.236	***	2.908	
Total Variance	205.328				205.172			
Number of Level-1 Observations	1399				2930			
Number of Level-2 Units	423				775			
Deviance (-2 x Log Restricted-Likelihood)	11344.72				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.057				0.034			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	8.47				7.11			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	15.16				41.93			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	8.88				8.96			
*Significance Levels: * p<0.10, ** p<0.05, *** p<0.01*								

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 6								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	-4.851	***	0.805	-0.37	-6.106	***	0.628	-0.44
Age within cohort	0.026		0.128	0.01	-0.056		0.088	-0.03
Ethnicity: Ref = White UK heritage								
White European heritage	-1.610		2.444	-0.12	0.003		1.580	0.00
Black Caribbean heritage	1.938		2.866	0.15	0.827		1.565	0.06
Black African heritage	2.292		3.543	0.18	2.826		2.282	0.20
Any other ethnic minority	2.705		3.295	0.21	1.483		2.062	0.11
Indian heritage	-3.833		3.311	-0.29	-1.761		2.087	-0.13
Pakistani heritage	0.402		2.456	0.03	-0.508		1.426	-0.04
Bangladeshi heritage	-6.410		4.743	-0.49	-3.849		2.853	-0.28
Mixed race	1.630		1.793	0.12	2.098		1.431	0.15
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-5.207		3.895	-0.40	1.888		2.451	0.14
Low birth weight, i.e. 1501-2500 g	2.514		1.688	0.19	1.683		1.220	0.12
Number of Siblings: Ref = No Siblings								
1 Sibling	-1.220		1.244	-0.09	-1.389		0.927	-0.10
2 Siblings	-0.338		1.372	-0.03	-0.458		1.020	-0.03
3+ Siblings	2.252		1.592	0.17	1.471		1.243	0.11
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	2.866	**	1.342	0.22	4.472	***	0.987	0.32
2+ Behavioural Problems	5.417	**	2.669	0.41	4.480	**	2.066	0.32
Parent Interview I: Mother's Highest Qualifications Level: Ref = None								
Other professional/ Misc.	2.172		3.138	0.17	-1.525		2.353	-0.11
Vocational	0.761		1.493	0.06	-1.471		0.961	-0.11
16 academic	-1.767		1.279	-0.14	-2.902	***	0.832	-0.21
18 academic	-3.360	**	1.714	-0.26	-4.949	***	1.226	-0.35
Degree or equivalent	-5.779	***	1.509	-0.44	-7.725	***	1.040	-0.55
Higher degree	-6.143	***	2.058	-0.47	-7.952	***	1.540	-0.57
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	3.786	***	1.192	0.29	3.132	***	0.950	0.22
Separated/Divorced	2.758		1.770	0.21	3.058	**	1.258	0.22
Living with partner	1.044		1.286	0.08	2.195	*	1.125	0.16
Widow/ widower	2.825		4.302	0.22	-0.905		2.968	-0.06
RANDOM-EFFECTS PARAMETERS								
Intercept	102.126	***	1.680		104.815	***	1.082	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	5.145	**	1.991		6.657	***	1.330	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	171.242	***	3.976		195.279	***	2.894	
Total Variance	176.387				201.935			
Number of Level-1 Observations	1147				2930			
Number of Level-2 Units	373				775			
Deviance (-2 x Log Restricted-Likelihood)	9078.23				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.029				0.033			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	19.07				8.50			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	62.56				44.27			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	21.72				10.39			
* p<0.10, ** p<0.05, *** p<0.01								

ANTI-SOCIAL BEHAVIOUR [SEM CFA Derived Latent Construct, IQ Standardized]: Child and Family Factors Model 7								
	ORIGINAL_DATA				IMPUTED_DATA_Stata_ICE			
	Estimate		Std. Error	Effect Size	Estimate		Std. Error	Effect Size
FIXED-EFFECTS PARAMETERS								
Gender	-4.900	***	0.801	-0.37	-6.119	***	0.628	-0.44
Age within cohort	0.003		0.127	0.00	-0.050		0.089	-0.02
Ethnicity: Ref = White UK heritage								
White European heritage	-1.347		2.393	-0.10	-0.296		1.563	-0.02
Black Caribbean heritage	3.164		2.802	0.24	0.312		1.586	0.02
Black African heritage	3.350		3.540	0.26	2.345		2.284	0.17
Any other ethnic minority	4.281		3.314	0.33	1.537		2.033	0.11
Indian heritage	-3.377		3.303	-0.26	-1.097		2.081	-0.08
Pakistani heritage	1.111		2.362	0.08	0.183		1.418	0.01
Bangladeshi heritage	-5.069		4.733	-0.39	-2.576		2.891	-0.18
Mixed race	1.669		1.778	0.13	1.959		1.422	0.14
Birth weight: Ref = Normal (and above average), i.e. > 2500 g								
Foetal infant/very low weight, i.e. <= 1500 g	-5.397		3.891	-0.41	1.506		2.457	0.11
Low birth weight, i.e. 1501-2500 g	2.763	*	1.653	0.21	1.899		1.211	0.14
Number of Siblings: Ref = No Siblings								
1 Sibling	-0.898		1.239	-0.07	-1.001		0.949	-0.07
2 Siblings	-0.310		1.370	-0.02	-0.130		1.040	-0.01
3+ Siblings	2.255		1.580	0.17	2.031		1.272	0.14
Child's Behavioural History: Ref = No Behavioural Problems								
1 Behavioural Problem	3.237	**	1.336	0.25	4.453	***	0.989	0.32
2+ Behavioural Problems	4.645	*	2.722	0.35	4.563	**	2.061	0.33
Parent Interview I: Father's Highest Qualifications Level: Ref = None								
Absent Father	-2.031		1.423	-0.16	0.073		0.906	0.01
Other professional/ Misc.	-9.512	**	4.023	-0.73	-4.287		2.829	-0.31
Vocational	-1.978		1.567	-0.15	-1.745		1.162	-0.12
16 academic	-3.341	**	1.330	-0.26	-2.685	***	0.997	-0.19
18 academic	-1.798		1.773	-0.14	-2.094		1.294	-0.15
Degree or equivalent	-6.628	***	1.505	-0.51	-6.376	***	1.112	-0.45
Higher degree	-6.310	***	1.836	-0.48	-6.712	***	1.507	-0.48
Marital Status of Parent/Guardian/Carer: Ref = Married								
Single	3.181	***	1.225	0.24	2.746	***	0.983	0.20
Separated/Divorced	2.562		1.779	0.20	2.835	**	1.297	0.20
Living with partner	0.499		1.291	0.04	1.859		1.163	0.13
Widow/ widower	3.805		4.284	0.29	-0.543		2.994	-0.04
RANDOM-EFFECTS PARAMETERS								
Intercept	103.009	***	1.610		103.604	***	1.130	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 2)	4.297		1.915		6.441	***	1.343	
RANDOM-EFFECTS PARAMETERS								
Variance (Level 1)	171.616	***	3.958		196.501	***	2.898	
Total Variance	175.913				202.942			
Number of Level-1 Observations	1158				2930			
Number of Level-2 Units	376				775			
Deviance (-2 x Log Restricted-Likelihood)	9160.52				.			
Variance Partitioning Coefficient (VPC)/ Intra-Class Correlation (ICC)	0.024				0.032			
Proportion of Level-1 Variance Reduction [Compared to Null Model] (%)	18.89				7.92			
Proportion of Level-2 Variance Reduction [Compared to Null Model] (%)	68.72				46.08			
Proportion of Total Variance Reduction [Compared to Null Model] (%)	21.93				9.95			
* p<0.10, ** p<0.05, *** p<0.01								

APPENDIX 8: The Factorial Composition for Self-Perceptions/ Dispositions and Views of School

Note: This Appendix draws heavily on a previous EPPSE report (Sammons et al. 2011b)

A.8.1. The Factorial Composition for Self-Perceptions/ Dispositions

TABLE A.7.1: The Factor Structure for Self-Perceptions/ Dispositions

Maths academic self image ***Cronbachs =0.91***	**English academic self image** ***Cronbachs =0.90***	**Anxiety** ***Cronbachs=0.78***
I learn things quickly in my Maths classes	I learn things quickly in my English classes	In class I worry about what the others think of me
I have always done well in my Maths classes	I have always done well in my English classes	I get a lot of headaches, stomach aches or sickness
Compared to others my age I am good at Maths	Compared to others my age I am good at English	I worry a lot
Work in my Maths classes is easy for me	Work in my English classes is easy for me	I am often unhappy, downhearted or tearful
I get good marks in Maths	I get good marks in English	I am nervous in new situations
		I have many fears, I am easily scared
Values ***Cronbachs=0.75***	**Popularity** ***Cronbachs =0.83***	**Enjoyment of school** ***Cronbachs=0.74***
Making sure strong people don't pick on weak people	I make friends easily	My school is a friendly place
Respecting rules and laws	Other teenagers want me to be their friend	On the whole I like being at school
Controlling your temper even when you feel angry	I have more friends than most other teenagers my age	I like to answer questions in class
Respecting other peoples points of view	Most other teenagers like me	School is a waste of time for me
Sorting out disagreements without fighting	I am popular with other pupils in my pupils in my age group	I like most of the lessons
		I am bored in lessons

A.8.1. The Factorial Composition for Views of School

TABLE A.7.2: The Factor Structure for Views of School

Teacher support ***Cronbachs =0.86***	**School environment** ***Cronbachs =0.75***	**Valuing pupils** ***Cronbachs=0.78***
Most teachers mark and return my homework promptly	My school has attractive buildings	The school values pupils' views
Most teachers make helpful comments on my work	Classrooms are nicely decorated and clean	Teachers listen to what pupils say about the school
Teachers praise me when I work hard	Toilets are well cared for and clean	The teachers in this school show respect for all pupils
Teachers tell me how to make my work better	My school is well organised	Teachers are unpleasant if I make mistakes
Teachers make me feel confident about my work	People think my school is a good school	Teachers are friendly towards me
Teachers are available to talk to me privately		
Teachers will help me if I ask for help		
I get rewarded for good behaviour		
Headteacher qualities ***Cronbachs =0.72***	**Behaviour climate** ***Cronbachs=0.72***	**Emphasis on learning** ***Cronbachs=0.68***
I often see the headteacher around the school	Most pupils want to leave this school as soon as they can	Most pupils want to do well in exams
The headteacher makes sure pupils behave well	Pupils who work hard are given a hard time by others	Teachers expect me to do my best
The headteacher is interested in how much we learn	Most pupils take no notice of school rules	The lessons are usually 'challenging' but 'do-able'
	There are often fights (in or around school)	Most teachers want me to understand something, not just memorise it
	Some kids bring knives or weapons into school	Most teachers believe that mistakes are OK so long as we learn
Teacher behavioural management ***Cronbachs =0.62***	**Learning resources** ***Cronbachs=0.70***	
Teachers make sure that it is quiet during lessons	There are enough computers	
Teachers make clear how I should behave	Science labs are good	
Teachers take action when rules are broken	We have a good library	
Teachers are not bothered if pupils turn up late	We get enough time using computers in subject lessons	

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